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THE ROMANCE OF PÆDIATRIC SURGERY.[1]

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I FEEL it is a great honour to be asked to deliver the second J. A. Cameron Memorial Lecture, and I am privileged in following Dr. Donald Cameron who last year gave the inaugural memorial lecture in honour of his father.

Many men are cast in the heroic mould, but the pattern of their lives—often predetermined by circumstances—is such that their field of endeavour in the common weal has a limited horizon, which does not extend beyond their own country or, indeed, even beyond their own district or city. It is not given to many of our profession to fill the role of a Banting or a Florey, but the responsibility is none the less upon us to labour faithfully in the field in which we find ourselves. The mantle of merit falls just as truly on the great general practitioner as on the world-renowned specialist in a narrow field.

John Alexander Cameron was beloved by all who knew him and particularly, of course, by his patients and friends in the town of Ipswich, where he practised from 1896 to 1941. Some of us were lucky enough in our young and impressionable days to feel the impact of his personality upon us. Perhaps that is why, in my mind's eye, I can see him clearly still, although it is fifteen years since his death. He was tall and erect, with a dignified yet kindly mien; when he spoke at a clinical meeting one always sensed the imprint of experience garnered and treasured over the years. Essentially a quiet and undemonstrative man, he was always ready and eager to pass on his knowledge to those of us who sought it. In Ipswich his name was a by-word. The implicit trust placed in him by his patients no doubt helped to sustain him when he was working, as he so often did, almost beyond the limit of his capacity. I am sure, were he alive today, it would be a matter of quiet pride for him to know that his son was so worthily upholding the family tradition, in the important post in which he now finds himself as a Minister of the Crown.

[1] The J. A. Cameron Memorial Lecture, delivered to the Ipswich and West Moreton Medical Association (B.M.A.) at Ipswich on July 18, 1958.

It is pleasing to me to remember that when I first knew him he was partnered by my wife's uncle, Dr. Basil Hart, with whom he worked in perfect harmony for many years.

Among his many other activities he was a councillor and past president of the Queensland Branch of the British Medical Association. He was largely responsible for the establishment of the Ipswich Clinical Society, and set a pattern of behaviour which played a large part in developing the traditional spirit of friendliness and cooperation which has always existed among the profession in Ipswich.

Verily, in the task to which he set his hand—that of the busy general practitioner in a large country town—Dr. Cameron proved himself truly great.

We know that when such men pass to their rest, the good they have done in this world does not die with them: however, it expresses itself in intangible and invisible ways which, easily enough, pass by unnoticed. It seems most fitting, therefore, that the memory of this beloved practitioner should be kept green by a memorial lecture, and that such a lecture should deal with a subject in which one feels he himself would have been interested. It is with this idea in mind that I have chosen to speak about pædiatric surgery tonight.

You will all agree that it is, from time to time, wise to pause for a moment, gaze into the past, consider the present and contemplate the future. Only in this way can we properly appreciate the efforts of those who have gone before us, be stimulated by the effective results achieved in our own time and make some attempt to assess not only the wonderful potentialities, but also, one may say with truth, the alarming possibilities of the future.

I invite you to consider the state of the profession as it existed less than sixty years ago. At the turn of the century, in spite of some wonderful advances in knowledge in the previous 100 years, the practice of medicine was still largely empirical and surgery was still in its infancy. Those men of medicine who have practised their art in this century have lived in an era in which one can claim there have been the most effective advances in medicine and surgery of all time.

Since 1900 many medical conditions including diabetes, pernicious anæmia and Addison's disease, hereto untreatable except symptomatically, have been brought under control by specific measures.

Improvements in general hygiene, prophylactic inoculation and effective drug therapy have practically eliminated many epidemic and endemic diseases which previously extracted a terrific toll; increasing knowledge of physiology, pathology and pharmacology and the introduction of many new drugs have cast into the limbo much of the uninformed dogma in evidence in the pharmacopœias of sixty years ago, and have placed in the hands of the physician an armamentarium which allows him to practise his art with considerable skill and precision.

Surgery has grown from infancy to manhood, aided to a great degree by the introduction of the antibiotics and the amazing advances and refinements in anæsthesia; the old days of the open mask and the Clover inhaler are almost forgotten, and in their place we have the era of intubation, relaxants, hypotension and hypothermia. Improvements in equipment and instruments have also played their part in this drama. Modern operating tables are press-button robots, allowing of any positioning at will with minimum disturbance of the patient. Shadowless lighting gives clear definition in deep operative fields; delicate instruments can illuminate many body cavities; mechanical devices can record fluid pressures in internal organs; electrical machines can measure changes of potential in the brain and heart. Many areas of the body hereto unexplored can now be exposed with certainty and safety, and many conditions previously inoperable can now be permanently cured or at least effectively relieved.

No branch of surgery has benefited more from the practical application of this great upsurge of knowledge than that dealing with surgical conditions appearing from birth to puberty, and no branch of surgery requires a nicer appreciation of the patient's capacity and limitations. Willis Potts, in a foreword to a recent symposium on pædiatric surgery, expressed this most aptly when he stated:

> If the new-born child with a congenital deformity could reason and speak it would beg imploringly—"Please, Mister Surgeon, exercise the greatest gentleness with my immature tissues and try to correct my deformity at the first operation. You know, I hope to use this part of my anatomy for sixty or seventy years. Give me blood and the proper amount of fluids and electrolytes; give me plenty of oxygen with the anæsthesia and I will show you that I can tolerate a terrific amount of surgery. You will be surprized at the speed of my recovery and I shall always be grateful to you."

Within living memory pædiatric surgery has become one of the recognized specialties, and it is something of the story of its developments which I wish to elaborate tonight.

Naturally, one's mind turns first to those congenital deformities of the alimentary tract which need immediate correction if life is to be saved. Such conditions include œsophageal atresia—more commonly known as tracheo-œsophageal fistula—atresia of the small intestine, malrotation of the gut, imperforate anus, meconium ileus, exomphalos and diaphragmatic hernia.

In 1940 Lanman wrote a detailed review of the histories of 30 patients with congenital œsophageal atresia operated on at the Boston Children's Hospital in the previous eleven years; all these patients died, but the knowledge placed on record then helped to pave the way for the results which can be achieved today; attempts to develop an ante-thoracic œsophagus were abandoned in 1945, and attention was directed to joining the two ends of the œsophagus in the mediastinum.

It is now appreciated that, in the past, operative success was often jeopardized by late diagnosis with the inevitability of pulmonary complications. With early diagnosis, the use of antibiotics, continuous suction and posturing (all to prevent aspiration pneumonia) and rapid transport to a special centre, the percentage of recoveries is steadily improving everywhere. In some units, especially those dealing with large series of cases, the recovery rate has risen to between 40% and 60% and in certain series even higher.

In 1927 an article in the *British Medical Journal* stated: "It is rarely possible for any treatment of congenital atresia of the small intestine to be curative on account of the non-distensibility of the distal segment." In 1932 articles were still being written describing series of cases all of which terminated fatally.

Congenital atresia of the small intestine still remains a formidable problem, particularly in the premature infant, but here again figures are improving steadily.

Malrotation of the mid-gut is usually associated with a narrow attachment of the mesentery of the small intestine to the posterior abdominal wall; this predisposes to volvulus, which rapidly leads to obstruction and strangulation. Until 1930 the great majority of such patients died, often without any attempt at surgical correction. It was the work of Ladd of Boston that pointed the way for the tremendously improved figures now obtained in neonatal small bowel volvulus. To diagnose and undo quickly such a volvulus at operation the whole of the small intestine must be delivered out of the abdomen. Ladd stressed the importance—after dealing with the volvulus—of relieving duodenal obstruction by dividing the constricting membrane, which is so often present, passing over the front of the second part of the duodenum to the malplaced caecum. A proper appreciation of the clinical feaures and correct surgical treatment of volvulus in the new-born now allows a great percentage of recoveries in this previously almost hopeless condition.

The salvage rate in cases of imperforate anus, exomphalos and congenital diaphragmatic hernia has shown a similar steady, if not quite so dramatic, improvement over the last thirty years.

Meconium ileus presents a very special problem; it is a neonatal complication of the constitutional disease of mucoviscidosis, and varies in the suddenness of its onset; clinically there are all the features of small bowel obstruction. Previously invariably fatal, quite a number of post-operative recoveries have been recorded, and some children now in their teens are carrying on reasonably well with a fibrocystic disease regimen.

In May, 1953, the first special neonatal surgical unit in England was opened at the Alder Hey Hospital, Liverpool. It is staffed by nurses specially trained in pre-operative and post-operative care of the new-born. Prior to its commencement the over-all mortality rate for neonatal surgical cases in the Liverpool area was 72%. In the second year of its existence, the mortality rate in this unit, excluding patients with pyloric stenosis over 4 lbs. in weight, had dropped to 23% — a striking tribute to the value of such specialized care. I hope the day will come when the population of Queensland will have risen enough for enlightened thought in the profession to press for such a unit at the Brisbane Children's Hospital.

Perhaps the most striking recent advance in abdominal surgery has been in the treatment of Hirschsprung's disease. In 1886 Hirschsprung, of Copenhagen, wrote his classical description of this condition. For the next fifty years various methods of treatment were attempted, but owing to the failure to uncover the pathological background of the disease, treatment remained unsatisfactory. In 1948 Orvar Swenson hit on the idea that the basic lesion might well be not in the grossly dilated colon, but in what seemed to be the apparently normal segment below it. He therefore empirically performed a recto-sigmoidectomy to remove this apparently normal segment of bowel and joined the dilated colon to the last few centimetres of the rectum. This stimulated pathological investigation in both Great Britain and the United States, and it was soon found that the basic lesion was a complete absence of intramural ganglion cells in the plexuses of Meissner and Auerbach in the bowel distal to the dilated colon. Recto-sigmoidectomy has now become accepted treatment for true Hirschsprung's disease.

Although the severer neonatal cases present some difficulty, surgeons all over the world are now able to cure a condition for which previously no hope existed.

In the early years of this century there was a sudden dramatic improvement in the surgical treatment of pyloric stenosis; prior to 1908 gastro-jejunostomy was the operation in vogue, but well over 50% of the babies so treated died. In 1908 Fredet introduced an operation in which he split the muscle of the pylorus longitudinally and sewed it up transversely. Then in 1912 Ramstedt, in attempting the Fredet technique, had to close the abdomen suddenly when his patient collapsed, after he had made only the longitudinal split in the muscle and before he could sew it up transversely. The patient recovered, and Ramstedt found he had done an operation which thereafter was to bear his name. Nowadays, with early diagnosis and adequate surgical care, the mortality rate, including cases of prematurity, should never be above 5%, and more than one series of 100 consecutive successes has been recorded.

Hutchinson performed the first successful operation for reduction of intussusception in 1874. Since then the recovery rate of patients suffering from this condition has steadily improved. Australia has a deservedly high reputation in the treatment of intussusception, and has received considerable prominence in this direction as a result of the pioneer work of Clubbe and Hipsley on reduction of the intussusception by hydrostatic pressure. This is not the time or place to enter into a discussion on the merits or demerits of surgical as opposed to non-surgical treatment of this emergency. However, it is important to stress that, whichever method of treatment is used, the quicker the diagnosis is made the greater is the chance of recovery, and there is no doubt that the excellent results achieved in Australia compared with some other countries are due in large measure to an awareness of this emergency, which allows our practitioners to diagnose it at a satisfactorily early stage of its development.

When I graduated in 1921 cardiac surgery was virtually unknown in Australia, and operations on the thoracic cage were limited to thoracotomy and thoracoplasty. In fact, as recently as 1937 an accredited American text-book stated: "There is no curative treatment, surgical or medical, for congenital heart disease."

Since then we have seen one of the most dramatic and fascinating advances ever known in any field of surgery—an advance which has entirely revolutionized the prognosis in quite a number of congenital cardiac lesions. Previously without any hope of improvement as a result of their disability, many of these children can now be either effectively cured or at least very materially improved.

Definitive diagnosis of these congenital heart lesions has been stimulated by the possibilities of surgical correction, and careful clinical examination aided by electrocardiography, angiocardiography and cardiac catheterization now allows of an accuracy of diagnosis hitherto undreamed of.

Robert Gross performed the first successful closure of a patent ductus in 1938, and this opened the way to surgical attack on other congenital cardiac lesions; certain other heart defects associated with patent ductus and even the presence of bacterial endocarditis are not contraindications to operation. Closure of a patent ductus remains probably the most satisfactory of all the cardiac operations in childhood. Whether the ductus is best ligated in continuity or should preferably be divided and the ends oversewn is still a fertile field for debate.

So far as I can discover, Crafoord of Sweden carried out the first successful operation for coarctation of the aorta in 1944. It is one of the most painstaking operations imaginable, and in the hands of a master is very impressive indeed to watch; bleeding can be extreme, and accurate measurement of the blood loss is essential throughout the course of the operation. In 1953 Gross wrote:

> While surgical therapy for coarctation of the aorta has been available only since 1944 it is now quite evident that it rests on a sound basis and has a great deal to offer most persons who are afflicted with this abnormality.

Operative attack on septal defects, pure pulmonic stenosis and the tetralogy of Fallot poses more difficult problems than those associated with patent ductus and aortic coarctation, but even in the former conditions, continued progress is being made in an effort to improve by surgery the general outlook for these unfortunate patients.

Advances in the last twenty years in surgical treatment of pulmonary lesions in children by means of segmental resection, lobectomy and even pneumonectomy now allow a very high percentage of cures for congenital and chronic inflammatory conditions of the lungs, for which previously no really satisfactory method of treatment was known.

The relatively recent development of infants' cystoscopes and elaboration of methods of investigation, including micturating cystograms, cystometrograms and ureteral peristaltic studies, have all helped to place the pathology of urinary tract disorders of children on a firmer basis; particularly is this so in cases of recurrent infection associated with megaureter.

For the last sixty years ectopia vesicæ has been treated by transplanting of the ureters into the sigmoid colon. Though quite a number of patients have derived continued benefit from this procedure, there is always the danger of subsequent hyperchloræmia or of obstruction with associated hydronephrosis and progressive renal damage. Quite recently, in those cases of ectopia vesicæ in which rectal control is good, the method originally attempted by Gersuny in Vienna has been revived with very promising results; in this operation the rectum is isolated from the sigmoid and the ureters are implanted into it; the sigmoid is then brought down anterior to the rectum to reach the surface in front of the original anal orifice, but surrounded by the external anal sphincter. This method has the great

advantage of providing some measure of sphincter control for both urine and fæces, and undeniably lessens the late complications sometimes associated with ureterosigmoidostomy.

You are all aware of the improvements which have been effected during the last fifty years in the treatment of acute appendicitis and acute osteomyelitis in children.

Denis Browne has been responsible for developing methods which have led to improved results in the correction of many congenital deformities of the lower limbs.

Ingraham and Matson have done outstanding work on hydrocephalus, which has brought about improved results in this extremely difficult problem.

A more sombre note must be struck in relation to malignant disease. The figures for recovery from Wilm's tumour have shown considerable improvement, but in other neoplastic diseases the mortality rate is still depressing in the extreme. Indeed, one can say that as a cause of death in childhood, malignant disease is second only to accidents. This problem presents a great challenge to future generations of medical practitioners interested in the welfare of children.

I hope I shall be excused for saying a few words about plastic surgery in childhood, which has always been one of my special interests. No doubt the knowledge of this branch of surgery in adults gained in two world wars, aided by modern anæsthetic technique, has been a big factor in the advances made in this field.

One should now be expected to get a pleasing result in any case of unilateral hare-lip; admittedly, in the more severe grades, one or more secondary adjustments are almost always necessary to obtain the best possible repair. In cleft palate, failure to obtain complete closure and a mobile and retroposed soft palate should almost never occur.

The difficulties which hypospadias presented in the past are indicated by the fact that over 150 different techniques for its correction have been described. Largely as a result of pioneer work by many surgeons in the last half century, I am emboldened to say that, with meticulous attention to detail, failure to obtain at the first attempt a penis which is satisfactory anatomically and functionally should rarely occur.

The famous children's hospitals of Great Britain and the United States have played a large part in the striking advances made in children's surgery in this century, and our own children's hospitals in the capital cities of Australia have made and are continuing to make a very worthwhile contribution in this field. No story in this country dealing with children's surgery would be complete without mention of the name of Harry Douglas Stephens of Melbourne. I can well remember how he impressed us all on his visit to Queensland in 1933. His example of alert perception, quick intuition and sound judgement is one we could well accept as a model for pædiatric surgeons of the future.

I invite you to consider how children's surgery of the high standard required to achieve the results of which I have spoken can be developed. The organization of a children's surgical centre can follow — and indeed has followed — many patterns. My first memory is of children's hospitals in which the surgeons on the staff undertook any work that came into their beds; these same men also held appointments on adult hospital staffs or at least did not limit their work to children. In my own case I was actively engaged in general practice when I got my first appointment to the Brisbane Children's Hospital as Honorary Relieving Out-patient Surgeon.

Gradually, some surgeons began to concentrate on children's surgery. These men naturally tended to develop within the hospital those particular aspects of the work in which they were especially interested. Gradually also, small specialist departments of cranial, thoracic, urological or plastic surgery developed in many children's hospitals, the rate of growth of these depending on the actual needs and the talent available. The surgeons employed in these small departments dealt, of course, with adults as well as children in their own field.

Now in the larger pædiatric centres with well established reputations, there is a trend for the general surgeons and, to a lesser extent, those in the special departments to concentrate solely on their work with children. As Robert Gross rightly states:

> The field of Children's Surgery has rather indifferent borders which shift according to the material available in any particular community, the activities of the staff in developing certain segments of the work and the facilities which are available at the Hospital.

I am convinced, however, out of my own experience, that in any children's hospital, wherever it may be, the best work is done by those surgeons who, over a long period, have had the opportunity to deal if not solely, at least predominantly, with children.

It will be reasonable to ask at this stage where lies the "romance" in children's surgery. Partly, of course, it rests, as already shown, in the amazing advances in our lifetime, which have revolutionized the prognosis for many patients previously doomed to early death or to a life of ill-health or persisting functional disability, with all its psychological handicaps. The "romance", however, is not limited to the bare recording of these scientific achievements. There is a spiritual side, which I am sure has been a big factor in the wonderful advances made in the care of children from babyhood to the full stature of manhood.

Children have youthful growing tissues, fresh and unspoiled by the ravages of the years, which respond wonderfully to efficient and gentle handling and which, when set on the road to recovery, mend with surprising speed and perfection; this is one of the miracles ever before the eyes of those caring for children.

No one who has been privileged to work in a children's operating theatre or a children's surgical ward can fail to have been impressed by the aura of happiness in evidence when a child, previously nigh unto death, safely passes one of the milestones on the road to ultimate and complete recovery.

And finally, and most wonderful of all, is the transcendent happiness of the parents when the recovered child —with all the years of his life yet to be—is delivered safely into their hands.

THE HEALTH OF PATROL OFFICERS IN THE TERRITORY OF PAPUA AND NEW GUINEA.

By ROBERT H. BLACK,
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DURING the preparation of a handbook on health and living conditions in the Territory of Papua and New Guinea from the point of view of the European resident, it became abundantly clear that no true picture was available of the actual incidence of sickness amongst Europeans in that Territory. A general idea was gathered from the figures for admissions to hospital, and the causes of death were available. These two sources provided information on the more serious illnesses, but the incidence of disease which did not result in admission to hospital remained a matter for speculation, as did the incidence of mental ill-health in the community.

During the past three years, the author has had contact with groups of patrol officers at the Australian School of Pacific Administration at Mosman, Sydney. At this school, officers who have completed two or more years of service attend for a period of one year. These officers have assisted in the investigation of the clinical use of primaquine for the eradication of vivax malaria.

The material presented in this paper has been accumulated during this period, but does not include casual observations made during field work in New Guinea, nor does the paper cover all aspects of the health of these officers. These observations have, however, directed some of the lines of inquiry which have been pursued with the officers at the Australian School of Pacific Administration.

This preliminary study has produced information on the physical and mental health of one particular group of the European community in Papua and New Guinea. It has pointed the way to further lines of inquiry and also to improvements which could be made in the method of selection of officers for service in New Guinea. Further, there is a firm indication that study in the field would reveal that some aspects of the conditions of service could be modified with benefit.

Patrol officers in the Territory of Papua and New Guinea are enlisted by way of a cadetship, which lasts for a period of two years. During this time the cadets learn the duties and responsibilities of patrol officers. They receive instruction by means of a correspondence course and guidance from their superior officers on the station to which they are posted. In principle they are not located by themselves in isolated outposts, but this may occur if no senior officer is available.

As soon as possible after the period of cadetship is completed and the cadet has become a patrol officer, he receives a year's instruction at the Australian School of Pacific Administration in the subjects related to his work. On return to New Guinea he is given increasing responsibility, and is then deemed suitable to undertake patrols and for appointment to isolated patrol posts in specified areas. Instruction in personal health measures is given to these officers before they proceed to New Guinea as cadets during a preliminary course at the Australian School of Pacific Administration. This course has sometimes been given at Port Moresby.

The duties of a patrol officer are many and various. He is a representative of the law and has police functions. He has, in addition to his administrative functions, often to act as postmaster, clerk for the treasury, customs and lands departments, meteorological observer and radio operator. He is often responsible for building houses and roads or the construction of an airstrip. He cooperates with the Department of Agriculture in helping the native people to improve their agriculture and introduce new crops. He is the officer who is in greatest contact with peoples who have recently come under administrative control. Part of his duties is the promotion of village hygiene and the improvement of native housing and living conditions.

Advancement in the service leads to greater responsibility over larger areas in the position of Assistant District Officer. The number of patrol officers in the service was 141 in September, 1958; there were also 84 cadet patrol officers at that time. Thus the group of 36 patrol officers studied here in some detail forms quite a large sample of the total number, and it also represents the largest group of these officers that may be seen together at the one time, as the remainder are scattered far and wide in Papua and New Guinea.

Incidence of Physical Illness.

The history of physical illness was obtained by means of a *questionnaire* from a group of 36 patrol officers. The disabilities from which they suffered during periods of from two to five years' residence in Papua-New Guinea are presented in Table I.

Of the 36 officers, only two had suffered no physical illness whilst in Papua-New Guinea. One of these had had four years' and the other two years' service.

Diarrhœa/Dysentery.

This group of infections is discussed more fully when a fæces survey is considered, but it is interesting to note that 12 of 20 officers with two years' service and 12 of 16 with four or five years' service had suffered attacks. The number of attacks reported varied from one or two up to many; for example, twelve in an officer with four years' service.

Malaria.

The diagnosis of many of the attacks of malaria reported was undoubtedly made on clinical grounds, but is is probable that the figures reported are close to the actual. Of the group of 36 who filled in the *questionnaire*, 18 stated that they had had one or more attacks of malaria whilst in Papua-New Guinea. The number of attacks was as follows: no attacks, 18 officers; one attack, eight officers; two attacks, three officers; three attacks, four officers; unstated, three officers. In another group of 22 officers, 14 stated that they had suffered attacks of malaria in Papua-New Guinea. Thus, of a total of 58 officers, 32 (55%) gave a history of malaria while they were in the Territory.

TABLE I.

Physical Diseases Affecting a Group of 36 Patrol Officers During Two to Five Years' Service in Papua and New Guinea.

Disease.	Number of Officers Affected.
Diarrhœa/dysentery	24
Malaria	18
Skin disease	11
Injury	6
Infectious hepatitis	5
Ear infections	2
Appendicitis	2
Tonsillitis	1
Influenza	1
Dengue fever	1
Renal colic	1

Although the numbers are small, there is an indication that the number of attacks of malaria increased with increasing length of service. Of those who had had malaria in the *questionnaire* group, those with two years' service had a mean of 1·4 attacks, those with four years' service, 2·3 attacks, and those with five years' service, 3·0 attacks.

The malaria suppressives stated as being used were chloroquine 19, amodiaquine 15, and proguanil 3 (the total of 37 includes one person who took either chloroquine or amodiaquine). It was found that there was a significant difference in the suppressive used by those with four or five years' and those with two years' service: of the former group, 13 of 16 used chloroquine, and of the latter group, only six of 20 used this suppressive ($\chi^2 = 9{\cdot}60$, $P < 0{\cdot}01$).

Questioned on the regularity of their taking of malaria suppressives, 12 of 36 claimed that they took the particular drug they used with absolute regularity; the remaining 24 admitted that consumption was irregular. There was no difference in the claimed regularity of consumption and the type of antimalarial drug used, nor any difference between the two groups with two years' and four to five years' service. There was a significant difference in the incidence of malaria in those who stated that they took their antimalarial with absolute regularity and those who did not; three of 12 developed malaria in the first group and 15 of 24 in the second group ($\chi^2 = 4{\cdot}5$, $P < 0{\cdot}02$). It is, of course, obvious that those who developed malaria in the first group were not taking their suppressive with absolute regularity. There was no significant difference in the incidence of malaria in the groups using amodiaquine, chloroquine or proguanil as the suppressive drug.

Twenty-one of 35 officers stated that they always used a mosquito-net. Some of the remainder stated that a mosquito-net was not necessary, because they were stationed in the highlands. A similar reason was given by some for not using a suppressive drug at some period. Altitude figures included one figure of 1760 feet above

sea level (malaria occurs at heights over 5000 feet in New Guinea).

In a group of 21 officers observed over a period of 11 months after returning to Sydney from service in Papua-New Guinea, 11 (55%) developed attacks of vivax malaria. This group ceased suppression soon after leaving New Guinea, and the onset of the first attacks was as follows: first month after return, no attacks; second month, three attacks; third month, three attacks; fourth month, two attacks; fifth month, one attack; sixth month, no attacks; seventh month, one attack; eight month, one attack. Thus, half of the first attacks occurred within the first three months after returning, but in one officer the attack was delayed until the eighth month.

It is noteworthy that a number of these officers have their first experience of a malaria attack in Australia and do not suspect the nature of their illness, which may be diagnosed as influenza by their medical attendant.

Primaquine, used in doses of 22·5 mg. daily for 14 days, has reduced the incidence of vivax malaria in these officers during their year's course at the Australian School of Pacific Administration from 55% to 8%; doses of 15 mg. daily for 14 days resulted in an incidence of 22%. These results have been reported elsewhere, but the administration of primaquine in the larger dose is of very considerable value in reducing the incidence of subsequent vivax malaria in individuals returning to Australia from New Guinea.

Analysis of a number of items in the *questionnaire* revealed little to correlate with stated absolute regularity in the use of suppressives. This attribute was not related to the constant use or not of a mosquito-net, nor to the statement made by the officer on his having or not received personal health instruction. None of six officers who stated that they were often or always lonely in New Guinea claimed they took their antimalarial regularly, whereas 11 of 28 who were never more than occasionally lonely stated that they were regular in their consumption of suppressives. This difference almost attains a significant level ($\chi^2 = 3{\cdot}48$), and may indicate that the regular consumption of an antimalarial is related to personality rather than to the amount of personal health instruction given to these officers. From army experience it could be said that disciplinary measures would be necessary to ensure a much higher figure for regularity in antimalarial consumption.

Skin Disease.

Eleven of 36 officers reported that they had suffered from skin disease in New Guinea. The details are as follows: tinea, six cases; tropical ulcer(s), three cases; acne, three cases. One officer had both tropical ulcer and tinea.

It is considered likely that this is an understatement of the incidence of skin disease, but at least it can be taken that about 30% of this group suffered from skin affections which they considered worth reporting. The tineas reported affected the feet or the groin. One officer stated that he had had three tropical ulcers in two years. Acne could be expected in this group of young men whose average age was 20·5 years on enlistment; the condition may possibly have been accentuated by the hot moist climate.

It is interesting to note that the universally preferred dress in this group was short trousers, although eight of 34 officers who answered the question on this subject stated that they sometimes wore long trousers, mostly at night. Patrol work, then, is mainly carried out in short trousers with a view to comfort. The protection to the skin of the legs afforded by long trousers is not thought to be sufficiently important to warrant the discomfort which long trousers may cause.

Injury.

Six of 36 officers reported injuries incurred during residence in Papua-New Guinea. Amongst a group of active young men, injuries would be expected from sporting activities, and the type of injuries recorded in the answers to this *questionnaire* are in agreement with this. Reported football injuries, sprained ankle, dislocated shoulder and neck injuries are of this nature. Motor-bicycles were associated with the other two injuries noted — burns from the exhaust and skin wounds requiring suture resulting from motor-bicycle accidents. There was no report of wounding due to hostile act by the native people.

Infectious Hepatitis.

Five of 36 officers stated that they had suffered from infectious hepatitis in Papua-New Guinea. These infections occurred over the period from August, 1955, to January, 1957. No attacks were reported during the remainder of 1957 when these officers were still in the Territory. The disease was apparently widespread in Papua-New Guinea during this period, as cases occurred amongst the officers in Manus, Sepik District (Telefomin and May River), Southern Highlands District and Morobe District. The disease is discussed further in a later section reporting the results of a fæces survey.

Other Diseases.

This group of diseases requires little comment. The implications of acute appendicitis occurring on an isolated station are quite apparent, and the problem is met by radio communication and aerial evacuation to base hospital.

Fæces Survey.

One specimen of the fæces of 36 patrol officers at the Australian School of Pacific Administration was examined by direct and concentration methods. Of this group 16 (44%) were found to be harbouring one or more of eight protozoal or helminthic parasites. The details are given in Table II. Nine of 20 officers with two years' service and eight of 16 with four or five yaers' service harboured parasites.

TABLE II.

Results of One Examination of the Fæces of a Group of 36 Patrol Officers from the Territory of Papua and New Guinea.

Parasite.	Number of Officers Infected.
Entamœba coli	3
Entamœba histolytica (cysts)	3
Entamœba polecki (cysts)	1
Endolimax nana	4
Giardia lamblia	1
Chilomastix mesnili	1
Ascaris lumbricoides	1
Trichuris trichuris	4

Of the 16 officers with parasites demonstrated in the fæces, 10 gave a history of diarrhœa or dysentery in Papua-New Guinea. None of those passing *E. histolytica* cysts had had any bowel disturbance during six months' residence at the Australian School of Pacific Administration.

Only five of the group of 36 showed no evidence of ingestion of fæcal material, i.e., only five had no history of diarrhœa, no history of infectious hepatitis, and a negative result of fæces examination.

Some items of the *questionnaire* were aimed at determining the possible sources of these alimentary infections. Thirty of 34 subjects stated that they drank water from streams, one stated that he first boiled the water, and three said that they did not drink such water. All of 35 officers who answered the relevant question employed a native cook, although seven occasionally cooked for themselves; 13 had taught the native how to cook; 24 stated that the cook used a latrine, but 10 were not certain and could only presume that he did; 17 stated that the cook washed his hands, but an equal number were uncertain about this, and some of these assumed or hoped that he did. It was sub-

sequently ascertained that this was the first occasion on which some of these officers became aware of the possibility of fæcal contamination of food by soiled hands.

Hookworm is a notable absentee from the list of parasites. The author made a survey of a battalion of Australian troops at Lae, Territory of New Guinea, during the war years, and found 50% infected with hookworm. When this present survey was proposed, it was thought that a similar incidence might be expected. One item in the *questionnaire* filled in by these officers asked if the officer ever went about barefooted. Of the 34 who answered this question 10 stated that they never went barefooted, 16 that they went barefooted only occasionally or rarely, as when in the house or swimming, and eight gave an unqualified affirmative answer. It appears that the habitual wearing of footwear is one of the health practices which is followed fairly assiduously by these patrol officers.

Serum Survey.

Blood was taken six months after their return to Australia from a group of 36 patrol officers with from two to five years' service to determine if antibodies could be demonstrated against leptospires and other organisms.

None of the sera obtained from these 36 blood samples contained antibodies against leptospires of the following 10 serotypes: *hebdomadis, pyrogenes, autumnalis, australis A, icterohæmorrhagiæ, canicola, pomona, hyos, grippotyphosa,* and *javanica.* Serological evidence presented by Forbes and Wannan (1955) indicated that leptospirosis is a not uncommon disease amongst the native people of Papua and New Guinea. The negative results obtained from these officers suggest that they do not share those activities (as yet to be determined) of the native people during which the disease is contracted. Here it is relevant to note that the absence of hookworm infestation in these officers indicates that they do not habitually go barefooted out of doors.

It was hoped that the sera could be examined for evidence of past dengue infection, but at the time of this investigation, this was not possible. However, all 36 sera gave negative results to complement fixation and mouse protection tests against Murray Valley encephalitis virus, which is known to occur in New Guinea.

The Widal reaction of the 36 sera demonstrated antibodies against *Salmonella typhi* and *S. parathyphi* A and B ("H" and "O" antigens) at various low titres in 31, indicating previous exposure to T.A.B. vaccine.

The Weil-Felix reaction gave a large number of low titre agglutinations against *Proteus* OX19, OX2 and OXK, but three sera showed positive reactions at a titre of 1/125: two against *Proteus* OXK and one against *Proteus* OX2. This is a suggestively high titre, but as these officers had been away from New Guinea for six months, it is difficult to explain the persistence of antibodies at such a titre, even if the subjects had suffered from typhus (scrub and possibly tick or murine) towards the end of their last sojourn in New Guinea (*Proteus* agglutinins rapidly disappear in convalescence from scrub typhus). Patrol officers in the active pursuit of their duty would be exposed to scrub typhus, and it is very doubtful if any of them impregnate their clothing with a miticide. The incidence of typhus in these officers requires further study in New Guinea itself by the laboratory investigation of fevers.

Hæmoglobin Values.

Estimations of hæmoglobin values were made on a group of patrol officers soon after their return to Australia in conjunction with observations on the effects of primaquine on the blood. The mean hæmoglobin value for 29 officers was 15·9 grammes per 100 ml. (S.D. 0·58 gramme). Hæmoglobin was estimated as oxyhæmoglobin with the use of a photoelectric colorimeter.

It should be noted that some of these officers work at stations in New Guinea where altitude may be expected to exert an influence on the hæmoglobin level. These hæmoglobin values were obtained from a different group from the one shown to be free from hookworm infestation.

Weight Changes after Return to Australia.

In the *questionnaire* group of 36 officers, inquiry was made about weight changes in the six months since their return to Australia. Eleven of this group had noted no weight change, four had lost weight (mean 8·5 pounds), 19 had gained weight (mean 12·8 pounds), and two did not know of any change. The weight change reported by those officers with two years' service was a mean increase of 3·3 pounds, and those with four years' service a mean increase of 9·3 pounds ($t = 1·879$, which just fails to attain significance at 5% level). However, a significant and remarkable difference was found in the weight changes observed by those who had been in dangerous situations on the job (mean increase of 9·0 pounds) and by those who had not (mean increase of 1·8 pounds; $t = 2·0744$, $P < 0·05$).

This does not imply that the dangerous situation was responsible for the subsequent gain in weight on returning to Australia, but indicates that those officers who have been posted in areas where such situations arise may become underweight for a number of reasons, beside anxiety, which are consequent upon such a posting. Some of these factors which may operate are the possibility of undernutrition from self-catering by young men, or difficulties in securing supplies; perhaps an increased incidence of diarrhœal diseases may occur, and alcohol may play a part. Then, too, over-eating on return to Australia may be a response to anxiety felt in New Guinea. These factors require further investigation. It is proposed to record the weights of officers when they pass through the Australian School of Pacific Administration on their way to New Guinea for the first time and to follow them again when they return after two or four years' service for their year's course. In the field, too, observations could be made on dietary habits.

Mental Health.

Service in New Guinea entails extra stresses on mental as well as on physical health. As well as contact with new cultures and with new values and attitudes of tropical Europeans, there are all the various facets of isolation, lack of urban amenities, activities which are dangerous at times, frustrations which accompany most work in the tropics, difficulties with food supplies and the numerous other items of tropical living. The particular job of patrol officer carries the opportunity for the gratification of power-seeking or authoritarian inclinations and aggression.

In this inquiry into the health of patrol officers an endeavour was made to investigate some of the aspects of mental health by means of a roneoed *questionnaire*, which officers were invited to answer immediately after it had been issued to them.

Areas Covered by the Questionnaire.

The *questionnaire* was constructed as an attempt to obtain information in the following areas. (i) Job satisfaction: (*a*) motive for joining the service; (*b*) satisfaction with the work; (*c*) happiness in the job; (*d*) thought of resignation from the job. (ii) Attitudes to authority, Europeans, and native people in Papua–New Guinea. (iii) Stresses encountered in the job and reactions to them: loneliness, dangerous situations, and difficulties encountered in the job. (iv) Spare time and leave activities, and also the consumption of alcohol. (v) Interest in events.

It is not proposed to record the questions in full. Some of the deficiencies of the *questionnaire* became apparent after its use, and indeed, many of the questions were deliberately presented open-ended with no suggested answers, so that the replies would provide suggestions for an improved model. Naturally, a completely truthful answer to all questions was not expected, although one officer came to a halt half-way through

the *questionnaire* when he realized that he was being too truthful. Another was hostile to any questions other than those concerning his physical health history; he refused to answer questions concerning personal health measures as well as those directed towards mental health. The remainder of the group cooperated well, although some of them subsequently expressed surprise that a medical or health *questionnaire* should concern itself with the subject matter outlined above. It is believed that this cooperation was, in large measure, due to the personal contact which had been made with the group in connexion with the work on primaquine and the personal attention given to those who subsequently developed attacks of malaria. In addition, personal contact had already been made with some of the group in the field in Papua and New Guinea. It is uncertain what the response would be to an outsider with a similar *questionnaire*. The officers were assured that the information supplied by them would be treated as confidential as to the individual concerned with specific questions and answers and would not prejudice them in their jobs.

In questions in which there was an obvious grading in the answers, a score was given which was determined by the apparent desirability from the point of view of mental health. It is not certain that this score would be in accord with one determined from the viewpoint of efficiency as a patrol officer. However, as pointed out by Sinclair (1957), the mental health of persons in contact with the evolving native folk of New Guinea is of very great importance, and patrol officers form the vanguard of such contact. Some of the stated qualities required of the patrol officer are "leadership, courage and the ability to cope with any situation that may arise" (Department of Territories, 1958).

Composition of the Group.

The group consisted of 36 young adult males whose ages, at the time the *questionnaire* was given, ranged from 20 to 28 years (mean 23·5 years). Three were married. Their academic record was at least the attainment of matriculation or its equivalent. Five had attended university for from one to three years, but none had taken a degree. The countries of birth included Australia, 26 officers (New South Wales 12; Queensland, six; Victoria, four; Tasmania, one; Western Australia, one; South Australia, one; Northern Territory, one); United Kingdom, three officers; New Zealand, two officers; and Ireland, Germany, Malaya, New Guinea and Shanghai, one officer each.

The average age at enlistment was 20·5 years, and at enlistment six of the 36 (17%) were paternal orphans. This is twice the expected figure of 8·4% for this age group in the Australian population, and immediately suggests a number of implications.

The social class of the home from which the officer came was determined from the stated occupation of the father. Five classes were defined, and the number belonging to each was as follows: Class 1, professional, eight; Class 2, semi-professional, nine; Class 3, skilled artisan, 14; Class 4, semi-skilled, three; Class 5, unskilled, one; unknown, one.

Twenty of the group had had two years' service, 15 had had four years' service and one had had five years' service in the Territory of Papua and New Guinea.

In a longer version of this paper (deposited at the School of Public health and Tropical Medicine) the answers to a number of items in the *questionnaire* are analysed in detail. Here the discussion is mainly confined to the question of job adjustment.

The stated reasons given by these officers for joining the service are as follows:

Chosen career	3
Escapism	7
Idealism	2
Outdoor type	4
Seeking responsibility	4
Just a job—"interesting work", etc.	13
No answer	3

Job Adjustment of Individual Officers.

It is not proposed to consider each answered (or unanswered) *questionnaire* as a separate case history. Rather, four items were selected forming a quasi scale (as developed by Stouffer and his colleagues, 1950) of job adjustment. The items forming the scale were as follows, in scale order: (i) relations with Europeans (46% positive); (ii) job satisfaction (56% positive); (iii) relations with native people (67% positive); (iv) loneliness (83% positive). A positive score in each of these items was obtained when the officer gave a favourable reply to the questions relating to the item. Thus, a positive score was most easily obtained in the item concerning loneliness and least easily obtained in the item concerning relations with Europeans.

The reproducibility rate of the scale was 0·924, which is acceptable although relatively low; but it is a quasi scale with other factors influencing replies, and probably would be improved with modifications of the *questionnaire*. Scale scores were allocated in the order of: four (pass on all four items), three (pass on second, third and fourth items), two (pass on third and fourth items), one (pass on fourth item only), and zero. There were 11 non-scale individuals in random distribution, and these were allocated to the nearest scale type. The distribution of the scores for the group of 36 patrol officers is shown in Table III.

TABLE III.

Scores Obtained by 36 Officers from Answers to Four Quasi Scale Items Concerning Job Adjustment: Scores According to Length of Service are also Shown.

Score for Job Adjustment.	Length of Service.		Total Number of Officers.
	Two Years.	Four to Five Years.	
4	5	7	12
3	4	6	10
2	2	3	5
1	3	0	3
0	6	0	6

It will be seen that six officers passed in none of the items examined and three passed in only one item. It is admitted that the scoring may need adjustment, but it is thought that from this *questionnaire* an instrument may be developed which will allow a fairly exact determination of an officer's ranking in items closely concerned with mental health.

Some of the other items of the *questionnaire* which are not directly related to those used to determine these quasi scale scores give interesting comparisons when studied. The mean scores for officers of the various social classes decreased as the social scale was descended: Class 1, 3·5; Class 2, 2·78; Class 3, 2·14; Classes 4 and 5, 2·0.

A significant difference was found between the scores obtained by those with two years' service and those with four or five years' service for the scale items under discussion, as is shown in Table III: nine of 20 officers with two years' service had scores of less than two, while none of 16 had a score of less than two amongst those with the longer term of service ($t = 2·9185$, $P < 0·01$). If this difference were due to resignation from the service, an annual resignation rate of the order of 15% per year in the third and fourth years of service might be expected. A resignation rate of 24% (11 out of 46) for the first term of two years was observed amongst officers who joined the service in 1954 and 1955.

The hobbies and spare-time activities of the various scale score groups for job adjustment are shown in Table IV. Sport features largely in those with the most favourable scores, whereas the drinking of alcohol as a stated spare-time activity increases remarkably with less favourable scores.

It is interesting to note that this grading according to the scores for job adjustment was not accompanied by a significant gradient in the incidence of malaria or diarrhœa, nor was stated regularity in taking anti-

TABLE IV.

Degree of Participation in Various Spare-Time Activities Related to Score for Job Adjustment.

Hobby or Spare-Time Activity.	Score for Job Adjustment (Percentage).				
	4	3	2	1	0
Sport	75	70	40	0	20
Social activities	42	20	40	0	0
Drinking of alcohol	0	10	60	67	40
Intellectual/creative	25	30	40	0	20
Spectator	83	70	100	100	60
Individual participation (non-sport)	50	50	40	33	40

malarials related to these scores. The opinions on the medical service available for patrol officers expressed by these score groups are shown in Table V. It will be

TABLE V.

Opinions Expressed on the Adequacy of the Medical Service Available for Patrol Officers Classified by Scores for Job Adjustment.

Score for Job Adjustment.	Medical Service Stated to be	
	Adequate.	Inadequate.
4	3	9
3	4	6
2	2	3
1	1	2
0	1	3

seen that these opinions are much the same in all score groups. On the other hand, these opinions on the adequacy of the medical service are significantly related to experience of dangerous situations, as is shown in Table VI. Thus, the unfavourable opinions expressed were probably based on experience when, at the particular times the officers had in mind, there was no medical assistance immediately available if it had been needed.

Brief comment may be made on the answers to a few other items of the *questionnaire*.

Those who stated that they had joined the service because colonial administration was their chosen career, and also the escapists, found satisfaction in their work. Some of those seeking responsibility, or possibly power, appeared to be satisfied, whereas the idealists were frustrated. The lovers of the outdoors, and many of those for whom the work is just a job, appeared not to derive the satisfaction expressed by others.

The absence of loneliness and stated job satisfaction were significantly related. Feelings of loneliness were significantly related to thoughts of resignation. Those who were often lonely did not appear to be on very good terms with the native people. Loneliness increased with descent through the social classes.

All of the 35 officers who answered the specific question of whether they drank alcohol or not stated that they did. Six of them said that they did not drink before they went to New Guinea.

The group of eight officers who spontaneously stated that the drinking of alcohol was one of their spare-time activities (in one case the only activity or hobby stated) were compared with those who did not make this statement. On almost all counts the former group had a less favourable score than the latter. Thus, the former group was less regular in taking antimalarials, suffered more malaria, derived less satisfaction from their work, felt less adequate for the job, had a less desirable response to difficulties, said they received less help on the job and from the course of the Australian School of Pacific Administration, had less news interest, experienced slightly more loneliness and had less favourable scores for relations with the native people. The incidence of a history of diarrhœa was identical in both groups, and the score for relations with Europeans was more favourable in those who stated that drinking was a spare-time activity. Most of these differences did not reach a significant level, but the trend is impressive.

TABLE VI.

Relationship of Opinion Expressed on Medical Service for Patrol Officers to Experience of Dangerous Situations.

Stated Opinion on Medical Service.	Dangerous Situations.	
	Experienced.	Not Experienced.
Adequate	4	7
Inadequate	17	6

$\chi^2 = 4 \cdot 44$, $P < 0 \cdot 05$.

Discussion.

Some individual answers to the *questionnaire* indicated quite a degree of disturbance. These have mainly shown up in the results of the scores for job adjustment, but it is probable that individual interview after a preliminary improved *questionnaire* would prove to be the most satisfactory method of obtaining information on mental health. Indeed, a few of the officers indicated that they would give answers during an interview, which they would not write down on the *questionnaire* form. Further, group discussion would undoubtedly be of considerable therapeutic help to a number of these officers.

It has been pointed out that a resignation rate of about 15% per year in the second term of service (third and fourth year) would be necessary completely to account for the differences in scores obtained in the two groups with either two or four and five years' service. An alternative explanation — a process of adjustment — implies that more satisfaction is derived from the job with increasing responsibility and with greater familiarity with the nature and objective of the work, that better relations with the native people develop, and that officers became more mature.

It is obviously important to determine which process is involved in these differences, as the second explanation indicates that it may be possible, with a few perhaps simple changes in the conditions of service, to hasten the processes responsible and thus shorten the adjustment period.

It seems likely that the high resignation rate observed in the first term of service is due to an exaggeration of the differences which have been demonstrated between those with one term and those with two terms of service, but this requires careful investigation as other factors, such as inadequate briefing on living conditions and conditions of service, may be involved. Further, 10 of the 11 resignations recorded above in the first term took place during the period of service and not during leave, which is a more common feature in resignations from other departments of the service. This may indicate that expectations from the job are not early realized or are too great, and also that some particular situation is responsible for the decision to resign. In those who resign during their leave, a more chronic state of disaffection is indicated.

A great deal could obviously be achieved by more careful selection of officers before appointment, keeping in mind the probable responses of the applicant to the stresses which have been indicated. It is probable that a considerable amount of assistance could be obtained by the psychological testing of applicants (and

their wives) as suggested by Sinclair (1957). At the present time the attributes especially examined in the selection of patrol officers are appearance and demeanour, attitude, capacity for responsibility and supervision, diligence, education, extra-curricular activities, family background, former occupations, initiative, judgement, marital status, oral expression, physique, quality of work, relationship with others, and written expression. Information on many of these must, of course, be sought from the applicant's referees. As the score for these attributes represents the subjective opinion of an interviewer, the result may rather represent a test of the interviewer than of the applicant. This list is a long one and the important qualities are probably few. Objective tests for some of the qualities sought in patrol officers have been evolved for other services and could well be used or modified for use here. Further tests could be developed.

From the point of view of prevention of physical illness, it is apparent that the instruction given to these officers has in large measure failed to secure full achievement. For example, more than half of these officers suffered from malaria attacks while in New Guinea. This failure may be largely accounted for by the attitude to such diseases as malaria in that territory, where an attack of malaria is socially acceptable and no stigma is attached; in fact, it may be a desirable qualification for belonging to the community. Thus, although the cadet may receive adequate instruction in personal health measures, he may not be encouraged to apply them, because of the attitude of the older residents of the country. In this regard it has been mentioned above that army experience indicates that universal absolute regularity in the taking of the antimalarials could be secured only by disciplinary measures. These were directed not at the members of the rank and file, but at the commanding officer. In the branch of the administrative service under consideration, it is not unreasonable to recommend strongly that the senior officers should assume some responsibility for the health of the junior officers under their command. A different attitude to such diseases as malaria and diarrhœa would undoubtedly emerge.

An item of the *questionnaire*, which has not as yet been mentioned, sought opinion on the measure of success in the job. The question was not understood by some, but others mentioned satisfaction with the work from a personal point of view, or the favourable opinion of superior officers. There was not one reference to the opinion of fellow officers of the same standing in the service. There are 141 patrol officers in the service at the present time, but they are scattered widely over the Territory; the only time they come together in any numbers is at the course at the Australian School of Pacific Administration. At this school there was, in the past, an attempt to form a club or a patrol officers' association, but this did not survive. It appears, then, that there is little peer group feeling, except perhaps while the officer is at the Australian School of Pacific Administration, and the patrol officer thinks of himself in relation to graded authority rather than as a member of a group of patrol officers. The opinions and attitudes which he adopts come from senior officers, and as he is young, they are probably accepted readily. It is apparent, from statements made on the relation of malaria to altitude in the answers given in the *questionnaire*, that some of these opinions are wrong in fact.

This hypothesis was tested by grouping the 36 officers who completed the *questionnaire* according to the district to which they were posted for their first term of service and by observing the scores for job adjustment secured by these officers. It is not proposed to present the details, but it was immediately apparent that the officers from some districts showed high scores for job adjustment (e.g., five of five officers from one district had a score of four — the expected incidence of a score of four is one in three), whereas officers from other districts obtained low scores (e.g., three of five officers from one district had zero scores and the other two scored two and three — the expected incidence of zero scores is one in six). It is probable that this represents, in large part, identification with a senior officer in the area and the patterning of attitudes and opinions upon this officer by the young, newly-arrived recruits to the service. In the examples cited, this partitioning of scores was not obviously due to geography or climate. The part the senior officer plays — for better or worse — in the adjustment of patrol officers is quite obvious from this evidence.

At the present time, patrol officers on isolated posts are visited regularly by their senior officers, who report on these visits. Attempts are made by the Public Service Commissioner's office to re-locate the patrol officer if interpersonal relationships are bad, but often the result is resignation from the service. Disturbing statements on the amount of help received on the job by patrol officers may be statements of fact rather than the expression of an attitude. Thus, while improvement may be expected from more careful selection of applicants, investigation of conditions of service may well reveal that these officers are subjected to a variety of unnecessary stresses. This, of course, implies objective field work and the possibility of regular visits by a personnel officer to help rather than to inspect the patrol officer in his work and adjustment.

Summary.

1. An account is presented of investigations into a variety of aspects of the health of patrol officers in the Territory of Papua and New Guinea.

2. The major physical illnesses reported by these officers during their service were, in order of frequency, diarrhœa and dysentery, malaria, skin disease, injury and infectious hepatitis.

3. A fæces survey of 36 officers showed that 16 harboured one or more of eight intestinal parasites. *E. histolytica* cysts were found in three cases. None harboured hookworm.

4. The histories and fæces examinations gave evidence of the ingestion of fæcal material by 31 of the 36 officers.

5. Answers given by these officers to a *questionnaire* indicated that the health measures practised by them fell far short of the ideal.

6. A survey of 36 sera from these officers gave no evidence of past leptospirosis or Murray Valley encephalitis.

7. The mean hæmoglobin value for a group of 29 officers, shortly after their return to Australia, was 15·9 grammes per 100 ml. (S.D. 0·58 gramme).

8. Weight changes observed after return to Australia were related to conditions of service in New Guinea.

9. Considerable attention was given to mental health aspects. A *questionnaire* was constructed to give information on job satisfaction, various attitudes, stresses encountered on the job and reaction to these, spare time and leave activities, alcohol, interest in events.

10. Some of the findings from this *questionnaire* are presented, together with the analysis of a quasi scale of job adjustment constructed from four items of the *questionnaire*.

11. It is suggested that more careful selection of persons recruited for this service would result in an improvement in the mental health level of officers and reduce the resignation rate, which is high in the first two years.

12. The importance of the attitudes of senior officers is stressed, and the investigation of conditions of service is suggested.

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A WARNING ON THE FREQUENCY OF ENDOTHRIX TINEA CAPITIS AMONG THE ABORIGINAL AND PART-ABORIGINAL POPULATION OF SOUTH AUSTRALIA.

By G. F. DONALD,
Adelaide.

THE "Annual Report of the Aborigines Protection Board of South Australia" for 1957 states that the aboriginal population of South Australia is not known with accuracy, but is believed to be over 5000, and is made up in almost equal proportions of full-blooded and part-aboriginal persons. This figure compares with the total population of South Australia in 1958 of 901,728, of whom 552,300 live in Adelaide and its surrounding suburbs.

The terms "endothrix" and "ectothrix" are used in classifying the varieties of tinea capitis seen in clinical practice, and describe the arrangement of fungal spores when infected hairs are examined under the microscope. "Ectothrix" refers to the external sheath of spores seen in microsporum infections, while in hairs invaded by "endothrix" types of fungi the spore formation takes place within the hair shaft. Under Australian conditions the distinction is an important one, and it has been found that the majority of ectothrix infections are due to *Microsporum canis* and that endothrix infections in South Australia are due to *Trichophyton tonsurans* and *T. violaceum* in almost equal numbers (Donald, 1958 and 1959).

M. canis is a parasite of domestic animals and man, and is the cause of the majority of cases of tinea capitis among white children. The clinical features are usually easily recognized, and spontaneous cure occurs after a period which averages five months. Endothrix infections, on the other hand, are often difficult to diagnose, are easily overlooked and show little tendency to natural cure. The clinical features of both types of infection have recently been reviewed (Donald, 1959).

Between July, 1954, and April, 1959, 279 white persons suffering from tinea capitis have been studied by the writer, and two adults and 20 children were found to have an endothrix infection. In contrast, all but one among the 70 coloured patients had the endothrix type of infection. Of this total, only three patients are believed to have been full-blooded aborigines and as in the white group, adolescent and adult patients with the endothrix type of tinea capitis were observed.

The fact that this group of 91 white and coloured patients includes 11 adolescent boys and girls and five adult women must be stressed. The adults were all mothers or grandmothers of infected children under treatment. These figures are in accordance with those published elsewhere on the frequency with which endothrix tinea capitis will persist into adult life (Pipkin, 1952).

Since January, 1958, an intensified search for infected subjects has been made at the Adelaide Children's Hospital, because of the large proportion of half-caste children who were found to be infected. As the clinical signs are often only slight, many subjects were not suspected of being carriers until they were examined both clinically and by laboratory techniques. It has been noticed since this study began that increased familiarity with the disease on the part of trained nurses and lay officers in charge of aborigines in institutions is producing an increasingly rapid flow of infected heads for inspection. This is important, because at present it has not proven practicable to conduct a State-wide inspection of every aboriginal head, and it is only through the cooperation of all concerned with the welfare of aborigines that this disease will be controlled. Some indication of the frequency of the infection can be gained from the following cases.

Group A.

Children in this group have been brought to the clinic because of the systematic survey which is being undertaken. They represent a first attempt to establish the frequency of the infection among the aboriginal population.

Children Fostered or Adopted by White Adults.

Fifteen children have been examined, and three cases of endothrix tinea capitis were detected; the three patients were aged three, seven and eight years.

A boy, aged three years, had been with his foster parents since he was aged eight months, and although he showed only minimal signs of dandruff, culture revealed the presence of *T. violaceum*.

A girl, aged eight years, staying with the same foster parent, had come from the country 12 months previously. The foster parent said that the child arrived with a very dirty head, which appeared scaly and showed patchy hair loss. It is doubtful whether a medical inspection had been carried out, and at that time the foster parent had no suspicion that the condition was tinea. At first it was thought that this girl had infected the younger boy, but as the culture from her head revealed *T. tonsurans*, this is not possible, and it appears that both children were infected when fostered. The third patient, a boy, aged seven years, was transferred from one foster parent to another, and later brought to the clinic by a welfare officer because of impetiginized chronic scabies. At the same time, distinct areas of hair loss were noticed on the scalp, and in addition there was a quantity of adherent white scale; this child, too, was found to be infected by *T. tonsurans*.

It would seem that adequate medical inspection was not made before these children were fostered.

Children Living in Hostels.

All school children living in three hostels in Adelaide suburbs while attending school have been inspected; seven of 15 girls and 11 of 16 boys examined were found to be infected. The ages in these groups range from eight to 16 years.

A Home for Aboriginal Children.

Of 27 aborigines in an institution providing care and education for aboriginal children of all ages, 11 were found to be infected.

Comment.

It can be seen that of 73 aboriginal children cared for under these differing conditions, 32 were suffering from endothrix tinea capitis.

Group B.

A number of children have attended the clinic because of the suspicion that all was not well with their heads.

Children in Hospital.

Sixteen children have been referred to the skin clinic while in hospital; 12 cases of endothrix tinea capitis were detected.

Children in Institutions.

All 11 children brought to the hospital while being cared for in government or religious institutions were infected. Nine children have been brought by officers of the Aborigines Protection Board while under their direct control, and six were infected.

Comment.

It is considered that this group is very important, because in most cases the first suspicion of infection was raised by trained nurses or lay welfare officers, and it proves that by an increased awareness among persons concerned with the care of aborigines, a great deal can be done to detect cases of this infection. It is obvious that a number of minimal lesions will not be noticed, but much basic information has been obtained in this way. As an extension of this idea, it was thought worthwhile to see whether the diagnosis could be made without bringing children to the clinic. Following the diagnosis of endothrix *tinea capitis* in a full-blooded aboriginal child from Ernabella Mission (some 900 miles north of Adelaide in the Musgrave Ranges close to the Northern Territory border), it was decided, through the cooperation of Sister V. Ramm of that Mission to see how many cases could be found on this station, which has a population of at least 350 full-blooded aborigines who have little contact with civilization.

Twelve subjects who appeared to have obvious changes of tinea capitis were known to be on the station; several of these had been treated with various local applications over a long period without benefit. Culture tubes were sent to Ernabella, and material collected from the suspected heads was placed in the tubes; these were then returned to Adelaide for further assessment. This very simple approach yielded seven positive cultures at the first attempt, and it is thought that, with the cooperation of similar organizations throughout the State, much information could be gained as to the numbers and species distribution of these infections.

Conclusion.

Many half-caste families tend to move from place to place, and it is often not easy to be certain of the site of origin of infection. However, it has been noted that at least 24 cases so far detected in Adelaide were among persons who probably acquired the infection while at the Government station at Point Pearce. This may in part reflect the greater contact of this group with civilization, as the station (population 424) is situated 120 miles from Adelaide on Yorke Peninsula near Port Victoria. However, to find 24 cases among the few persons who have been available for inspection suggests that the infection rate is very considerable. It is thought that this infection rate may be as high as one in three among the children and adolescents at Point Pearce, and from the smaller number of subjects examined from Point McLeay (100 miles from Adelaide), it seems probable that it too has a very high infection rate.

At the Adelaide Children's Hospital all coloured children admitted are suspected of being carriers of this infection, and no coloured child will in future be regarded as free from tinea until laboratory proof of the absence of infection has been obtained. This extreme course seems to be justified by the frequency with which cases are being found at the skin out-patient department. It should be stressed that during 1958, as a result of intensified efforts at case-finding among aborigines, 52 new cases of endothrix tinea capitis were detected.

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THE PATHOGENESIS OF GIARDIA LAMBLIA IN CHILDREN.

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DURING the course of an investigation into the causes of steatorrhœa in a large group of infants and children (Anderson, 1959), as a routine procedure stools were examined for the presence of parasites as well as pathogenic organisms. *Giardia lamblia* cysts were found in the stools of a small number of these children as the only abnormal finding, and relief of symptoms followed the eradication of the parasite by treatment. Since that time other children have been studied. This paper will describe the clinical histories of some of these children infested with *G. lamblia*, and discuss the findings in relation to the pathogenicity of this parasite, and also in relation to the findings of other workers in this field.

Clinical Material.

Patients were usually referred for investigation because of abdominal symptoms, which included chronic diarrhœa, abdominal distension, failure to gain weight normally, recurrent abdominal pain, the passing of pale, bulky stools and anæmia. Investigations, such as a Mantoux test, microscopic and cultural examination of urine and blood examination, were carried out on the whole group as a routine procedure. Fat-balance studies were also performed on the majority to determine the presence of steatorrhœa, the figure of 90% absorption being taken as the lower limit of normal. On patients showing steatorrhœa, relevant tests such as a sweat test, duodenal intubation or barium studies of the gastro-intestinal tract, were carried out to differentiate the disease entities. All patients had stools examined for ova and cysts as well as for pathogenic organisms.

From the entire group investigated, 13 children have been selected who showed as their only abnormal finding *G. lamblia* infestation. Of these 13, 12 showed lack of normal weight gain or even weight loss, 11 had chronic diarrhœa and three had steatorrhœa; four had abdominal distension and eight were anæmic.

Reports of Cases.

The cases of the three who had steatorrhœa will be described first.

CASE I.—A male infant, born at full term, was examined on a number of occasions during the first two years of life. From the age of six months he was repeatedly noticed to be pale, and to have some abdominal distension with constipation and bulky, pale stools. At the age of 23 months he weighed 7·5 kg. and had a hæmoglobin value of 60% (9·9 grammes per 100 ml.). Culture of the stools gave negative results, but a fat balance study during six days when the fat intake was 50 grammes per day showed 88% absorption. Duodenal intubation revealed that the pancreatic enzymes were normal. The diagnosis was considered to be that of cœliac disease, but the child failed to show definite improvement on a diet free of wheat gluten. However, it was not until the age of two years and three months, when he was thoroughly reviewed, that his stools were examined microscopically and the cysts of *G. lamblia* were seen. He still had all his symptoms. Mepacrine in doses of 100 mg. per day was given for five days, and after this the *Giardia* cysts disappeared and he improved clinically. Fat absorption returned to normal (95%). He was examined intermittently during the next four years, but showed no further abdominal symptoms.

CASE II.—A male infant, born at full-term, failed to gain weight adequately from early infancy despite a good appetite. Diarrhœa was said to be absent, but home conditions were very poor and the mother was unreliable. He presented at the age of six months with an upper respiratory tract infection, and was found to have a distended abdomen and wasted limbs. His weight was 5·3 kg. (birth weight 3·8 kg.) Microscopic examination of a stool revealed numerous cysts of *G. lamblia*, but no other abnormality. Duodenal intubation showed normal enzymes, but fat-balance studies revealed steatorrhœa with a fat absorption of 85%, the average output

of fat in the stools being 9 grammes per day. No other cause for his failure to thrive and steatorrhœa was found. He was then given two courses of mepacrine of five days each, in a dose of 100 mg. per day. After this no *Giardia* cysts were seen in the stools and fat-balance studies during a seven-day period showed fat absorption to be 92%. In hospital on an adequate feeding, the child gained 0·9 kg. in five weeks before mepacrine was given. On the same feeding, after mepacrine had been given, he gained 0·75 kg. in ten days. Owing to poor home conditions, the child was kept under observation in hospital for a period of four months, and during this time he thrived well and had no abdominal symptoms.

CASE III.—A part-aboriginal female infant was admitted to hospital at the age of seven months. She had been found a month previously abandoned in the country, and had been admitted to a country hospital with malnutrition and infected scabies, weighing 3·2 kg. On examination when she was transferred to Melbourne, she weighed 4·1 kg., and had abdominal distension, wasting of the limbs and a widely disseminated pustular eruption regarded as lichen urticatus. Steatorrhœa was demonstrated, fat absorption being 67%. Microscopic examination of stools revealed numerous *Giardia* cysts. All other investigations, including a duodenal intubation, gave normal results. She was given 150 mg. of mepacrine daily for five days, and after this microscopic examination of a stool did not show *Giardia* cysts. Fat-balance studies showed 89% fat absorption. After eradication of the *G. lamblia* she improved, consistently gained weight (to 6·4 kg. at the age of nine months) and lost her abdominal distension. On her discharge from hospital she appeared perfectly well.

Nine patients had chronic or subacute diarrnœa and *Giardia* infestation, but fat absorption was normal in each case. The following four case histories are representative of this group.

CASE IV.—This boy was admitted to hospital at the age of two years and three months, having thrived until the age of 18 months. For the nine months before his admission he had had four to six loose, pale, bulky and offensive stools each day, and was losing weight. Examination showed that he was pot-bellied. No abnormality was found apart from giardial infestation. After a course of mepacrine, in which the *Giardia* were eradicated, he thrived and had no further diarrhœa, apart from one short apparently acute infective episode some time later.

CASE V.—A girl was referred to hospital at the age of four years, having had loose stools and frequent abdominal pain for eight months. Her appetite was good, but she was losing weight. There had been no improvement with a diet of low fat content and sedation. The only abnormality found was *G. lamblia* infestation. She was given a course of mepacrine, after which her bowel habits became normal. She appeared very well and gained weight.

CASE VI.—A boy, aged four and a half years, had developed a distended abdomen, with extreme wasting and frothy, offensive stools at the age of 12 months, and had been diagnosed as having cœliac disease, but did not respond to a strict gluten-free diet. Attacks of diarrhœa with offensive stools had continued ever since, despite a continued gluten-free diet. When he was examined at the Royal Children's Hospital, the only abnormality found was *G. lamblia* infestation. He was given a course of mepacrine, which eradicated the *Giardia*, and after this his general health improved, he had no further abnormal stools and he gained considerably in weight. Two and a half years later he is still thriving, has no abdominal symptoms and is taking a normal diet.

CASE VII.—A male infant had been admitted at the age of 20 months to the Children's Welfare Department from surroundings of neglect and filth, and since then had had persistent diarrhœa, which had not cleared despite a period in an infectious diseases hospital. The only abnormality on examination of the child at the Royal Children's Hospital at 22 months was some degree of abdominal distension. Microscopic examination of a stool showed numerous cysts and trophozoites of *G. lamblia*, but no other abnormality. He was given a course of mepacrine, after which no further cysts were seen. He gained weight well and had no further diarrhœa.

All the patients described so far were failing to thrive or were even showing weight loss, in addition to chronic bowel symptoms. However, there was one infant, who presented with persistent failure to gain weight, and in whom no abnormal abdominal or bowel symptoms were present at any stage.

CASE VIII.—A female infant, aged two and a half months, was admitted to hospital with poor weight gain. The birth weight had been 3·0 kg. and her weight at two and a half months was 3·4 kg. On examination of the baby no abnormality was found, and extensive investigations during a month in hospital showed no abnormality other than *G. lamblia* infestation. During this first month she lost further weight to 3·2 kg.; but immediately after a course of mepacrine, which eradicated the *Giardia*, she showed in hospital a steady weight gain of 0·6 kg. in one month, and this was maintained on her discharge.

Discussion.

This study has shown that a small number of children with abdominal symptoms, including chronic diarrhœa and steatorrhœa, had *G. lamblia* infestation of the bowel. The symptoms in these patients disappeared after eradication of the organism.

There appears to be much confusion in the literature regarding the pathogenesis of the parasite *G. lamblia*. It is known that the parasite inhabits the duodenum and small intestine in man, the trophozoites sometimes appearing in large numbers in aspirates of duodenal fluid. The cysts are passed in the stools and can be recognized easily.

Much of the earlier work in which various symptoms were attributed to *G. lamblia* is suspect, because of lack of controls and inability to eradicate the organism. Symptoms incriminated include diarrhœa or irregular bowel habits, abdominal pain, flatulence, dyspnœa, poor weight gain, anæmia, nervousness, headache, dizziness and lassitude. There have also been reports of outbreaks of acute enteritis amongst children and adults attributed to *G. lamblia* (Ormiston *et alii*, 1942). On the other hand, numerous authors (Boeck, 1927; Kraemer and Asher, 1934), have doubted that there is proof that *G. lamblia* causes symptoms at all. However, since an effective means to eradicate the parasite has been introduced, more convincing evidence of pathogenicity has been available.

Veghelyi (1938) compared 92 children with *Giardia* infestation with 92 controls, and found that as a group they had a higher incidence of abnormal stools and that improvement occurred with treatment. In 1940 he investigated a group of infested children, and found that 10 of the 14 studied by means of a fat balance had steatorrhœa, which disappeared with eradication of the parasite. Hartman and Kyser in 1941, from the Mayo Clinic, reported 100 cases of *Giardia* infestation, 60 of the patients having diarrhœa. They found that in those treated and followed up, the diarrhœa cleared with eradication of the parasite.

The stools are described by many workers as typically loose or fluid, bulky and numerous. They are not blood-stained, and few authors note mucus. In many studies there has been a high incidence of abdominal pain which also was relieved with eradication of the parasite. Veghelyi (1938) noted that 42 of his 92 infested children complained of abdominal pain, and in Hartman and Kyser's (1941) series of 100, 65 had some form of abdominal pain.

Most studies have also reported a high incidence in infested children of anæmia of an iron-deficiency type, seldom severe, which responded to eradication of the parasites.

Giardia infestation has been regarded as a cause of failure to thrive and even of weight loss in infants and young children. Careful studies by Veghelyi (1940), by Veghelyi and Lancos (1949) and more recently by Brown (1948) have suggested that this is due to failure to absorb foodstuffs rather than to a toxic effect of *Giardia*. Affected children may be underweight, and eradication of the parasite in these children is followed by increase in their weight. There have been several reports of *Giardia* infestation simulating cœliac disease in infants. Veghelyi (1939) made a careful study of a boy, aged 25 months, who was grossly underweight, pale and weak, with a large, protruding abdomen and offensive, bulky, pale stools. Fat-balance studies showed 22% fat absorption, which improved after a course of mepacrine. With eradication of *Giardia* there was progressive clinical improvement.

Veghelyi with Lancos (1949) also reported the case of a boy, aged 20 months, with vitamin A deficiency, who presented with emaciation, keratomalacia of both eyes and loose stools of over one year's duration. He was found to have a low vitamin A blood level and impaired vitamin A absorption, and his condition improved rapidly to normal after a course of quinacrine.

The means whereby *Giardia* exerts a harmful effect has been under discussion. It has been stated that the trophozoites produce irritation of the intestinal mucosa. Morrison and Swalm (1939) quoted the findings of Chevalier Jackson, and also of Schindler, who noted signs of gastritis on gastroscopic examination of patients with *Giardia* infestation. The same authors reported that duodenal aspirates might contain excessive mucosal cells. Veghelyi (1940) and Veghelyi and Lancos (1949) suggested that symptoms were produced by the mechanical action of large numbers of the parasites blocking the absorbing surface of the upper part of the small bowel. *G. lamblia* has a large ventral sucker with which it attaches itself to the intestinal mucosa, and considering the enormous numbers that may be present in the bowel, heavy infestation may well reduce the absorbing surface. Veghelyi (1940) reported his investigations of fat balance, fermentative activity of stools and excretion of bile pigments in support of this hypothesis. No evidence of intestinal inflammation has been noted at autopsy or in duodenal aspiration specimens; but Lyon and Swalm (1925) reported that cells from the upper part of the small intestine were frequently found to be distorted in duodenal aspiration specimens, and this was attributed to the mechanical effect of the ventral sucker of the trophozoite.

In the cases presented in this paper, it would be difficult to prove beyond doubt that *G. lamblia* played the major role in causing symptoms. In a few cases there was an associated factor, such as parental neglect, which may well have predisposed to symptoms. In those cases in which steatorrhœa was demonstrated and in which normal fat absorption followed eradication of the parasite, no other treatment being given, there is more definite evidence of pathogenicity of *G. lamblia*. In these three cases infestation was particularly heavy. It may be that it is necessary for some other factor to be present for *G. lamblia* to produce symptoms; this is suggested by the fact that most reports of symptoms associated with infestation come from parts of the world where poverty and malnutrition are common. The fact that in all cases of the present series eradication of *Giardia* was followed by relief of all symptoms strongly suggests that *Giardia* played the important role in their causation. In some cases general care of the child had always been good, and in others the supervised care and feeding that began when the child was admitted to hospital were not associated with improvement in his condition until the *Giardia* had been eradicated. It seems that infants and young children are more likely to be affected by infestation than older children. The average age of onset of symptoms in this group of 13 children was one and a half years, and nine of the children were aged under two years.

It is well known that *Giardia* infestation may be present without any symptoms at all. The incidence of infestation in the Victorian community is unknown, and a survey has been undertaken to obtain some evidence of this incidence in children (Court and Stanton, 1959).

It would seem reasonable that *G. lamblia* infestation should be sought in a child with abdominal symptoms, and if it is present, it should be eradicated with a course of mepacrine. Mepacrine is well tolerated and effective. The recommended dosage is 25 mg. three times a day for infants, 50 mg. three times a day for young children and 100 mg. three times a day for older children. A course should last for five days, and it may be necessary to repeat the course later.

Summary.

Among a large group of children with abdominal symptoms including steatorrhœa, 13 were found to have *G. lamblia* infestation. In three of these steatorrhœa was present.

Eradication of the *Giardia* led to disappearance of the symptoms in all 13 children. It seems reasonable to attribute the symptoms to the infestation.

Representative clinical histories are given.

It is suggested that when children have chronic abdominal symptoms, a search for *G. lamblia* in the stools should be included in the routine investigations, and when it is found, the parasite should be eradicated with a course of mepacrine.

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THE INCIDENCE OF GIARDIA LAMBLIA INFESTATION OF CHILDREN IN VICTORIA.[1]

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GIARDIA LAMBLIA is a protozoal parasite inhabiting the small bowel in man, the flagellated trophozoite being found in duodenal aspirate and the cysts in the stools. There has been interest in the parasite as a possible pathogen since the early part of this century. At the Royal Children's Hospital, Melbourne, a small number of children among a series who were investigated for abdominal symptoms (including malabsorption and chronic diarrhœa) have shown heavy giardial infestation (Court and Anderson, 1959). When *G. lamblia* was eradicated the symptoms disappeared, and it seemed reasonable to attribute the symptoms in these cases to giardial infestation. On the other hand, the finding of *Giardia* in stools can be incidental and may be confusing. An attempt was made in the present study to find the incidence of *G. lamblia* infestation in a group of Victorian children, and to discover any association with symptoms in affected children.

Material and Methods.

Children were selected at random from those who were admitted to two wards of the Royal Children's Hospital, Melbourne, for unrelated conditions, and from those who resided in Melbourne institutions (St. Joseph's Foundling Home, Broadmeadows, and Sutherland Home for Children, Diamond Creek). In both these institutions hygiene, sanitation and child care are of the highest standard. From these children the following groups were studied:

[1] Read at a meeting of the Pædiatric Society of Victoria on March 11, 1959.

(i) 18 infants aged under 12 months residing in institutions; (ii) 20 infants aged under 12 months residing in their own homes; (iii) 19 infants aged under 12 months with acute gastro-enteritis; (iv) 53 children aged over 12 months residing in institutions; (v) 38 children aged over 12 months residing in their own homes.

Infants were grouped separately from older children because of the different opportunity for spread of the parasite in the two age groups. Infants with gastro-enteritis were selected, because it was thought possible that under conditions of alimentary irritation and gastro-intestinal hurry, recovery of parasites might be greater than from children without diarrhœa. Clinical assessment of each child was made by one of us (J.M.C.), in which a history was obtained of the usual bowel habits (type of stool, number a day and regularity) of the child and of recent change in bowel habits, together with a history of abdominal pain or distension. Appetite, growth, general health and presence of general symptoms such as headaches, dizziness and pallor were also recorded. Contact with other children in institutions was noted. Each child was examined and weighed and the hæmoglobin value was estimated (in most cases a full blood examination including an eosinophil count was made). Stools were collected from each child, and were examined both macroscopically and microscopically. Stools were examined microscopically, both in the fresh state, and after concentration with the formalin-ether sedimentation technique of Ritchie (1948) and staining with iodine. Slides were also stained with Mallory's phosphotungstic acid hæmatoxylin stain, after being fixed in Schaudinn's fluid.

In each case an exhaustive search was made for any form of parasite. Each stool was cultured on an S.S. agar plate ("Difco") and into tetrathionate broth, which was subcultured onto a brilliant green agar plate. Non-lactose-fermenting organisms were identified by the usual biochemical and serological methods.

Although in many cases only one stool examination was practicable, two or three examinations were performed on most children. This survey does not include children who were being investigated for abdominal symptoms, and for whose condition *G. lamblia* infestation was considered as a possible diagnosis.

The period over which this study extended was from August, 1956, to December, 1957.

Results.

The results of the survey are set out in Table I.

The incidence in toddlers in one institution was high, 16 cases of giardial infestation being found in 23 toddlers, whereas no cases were found in 15 infants under the age of 12 months in the same institution. In the institution for older children, only six infested children were found among 27 examined.

The hæmoglobin value, in grammes per 100 ml., was estimated in each case, and then compared with figures given for normal children in New South Wales (Walsh *et alii*, 1953), no satisfactory normal values being available for Victoria. Each figure was expressed as plus or minus so many grammes' deviation from the normal values for sex and age, and a mean value was obtained for each group of infested and non-infested children. The non-infested group of children showed a mean value of 0·47 gramme per 100 ml. less than the stated normal, and the infested group a mean value of 0·88 gramme per 100 ml. less than the stated normal. Both figures fall within the standard deviation of approximately unity, and there is no statistical difference in the two values.

It was noted, however, that the two infants suffering from gastro-enteritis who were infested with *Giardia* were anæmic (hæmoglobin values of 64%—9·3 grammes per 100 ml.—and 52%—7·5 grammes per 100 ml.—respectively), and no other adequate explanation for the anæmia was found. None of the other 17 infants with gastro-enteritis had any degree of anæmia.

Full blood examinations, including eosinophil counts, were made on 72 of the children, and no association was found between eosinophilia or any other blood abnormality and infestation in any child.

Each child was weighed and the weight was expressed as a percentile. The tables used were those from the Australian Institute of Anatomy, Canberra, 1957. No significant difference in weight percentiles was noted between the *Giardia*-infested and the non-infested group. It was noted, however, that both infants with giardial infestation were less than the 10 percentile weight figures for their age.

There was no significant difference in the incidence of abnormal bowel habits including diarrhœa, or abdominal signs including pain and distension, in the two groups of infested and non-infested children. One of the infants with *Giardia* infestation had had chronic diarrhœa and some abdominal distension.

TABLE I.

Subjects.	Number Tested.	*Giardia Lamblia* Present.
Infants:		
At home	20	0
In institutions	18	0
Suffering from gastro-enteritis	19	2
Total	57	2
Children:		
At home	38	7
In institutions	53	22
Total	91	29
Grand total	148	31 (21%)

Discussion.

The incidence of *G. lamblia* infestation has been widely reported as high in both temperate and tropical countries. A review of overseas literature shows incidence figures ranging from 2% to 30% in surveys of several thousands in general populations of England, America, Europe, India and other countries, with an over-all incidence in world series of approximately 10%.

The incidence in children has been less frequently estimated, but appears to be higher than in adults, a figure of 25% to 30% being representative of several surveys; but most reports indicate that infants are less commonly infested than older children.

In a survey in Townsville, Australia (Willis, 1923), when 96 children under the age of six years were examined, one-third had a *Giardia* infestation.

The present survey was too small in numbers and too limited in representation to give a true incidence of *G. lamblia* infestation in Victoria. Children were investigated from all over Victoria, but mainly from Melbourne, both from their own homes and from institutions. In the groups studied it was shown that *Giardia* infestation was very uncommon in babies under the age of 12 months. In only two infants of the group of 57 was *G. lamblia* found, and both were anæmic and underweight and one had had diarrhœa for two months. On the other hand, *Giardia* infestation appears fairly common in young children, and was found in 29 of the 91 examined. As a group these infested children appeared to be unaffected, not being significantly different from the uninfested group in weight, degree of anæmia, bowel habits and general health.

The spread of *Giardia* is predominantly from person to person; but cysts survive for a long period, and may be spread in dust, and by household pets and by vermin and insects. The chances of spread are greatest in the young

child who is starting to play with other children, and least in the first 12 months of life. This presumably accounts for the sharp rise in incidence after infancy.

Examination of stools for *G. lamblia* is a relatively simple procedure, and heavy infestation is easily recognized. If only *G. lamblia* cysts are being sought, stools need not necessarily be fresh; but since in such cases exclusion of other parasites is desirable, stools should be examined as soon as possible after they have been passed.

Summary.

The incidence of the protozoal parasite, *G. lamblia*, has been investigated in groups of infants and children in Victoria living both in institutions and in their own homes.

Infestation is uncommon in infants up to the age of 12 months, being found in two of 57 infants, but is common in older children, being found in 29 of 91 children.

Although infestation may be associated with diarrhœa, poor weight gain, anæmia and abdominal symptoms, it is usual for it to be symptomless. None of these symptoms was associated with infestation in older children in the series. However, the only infested infants were anæmic and underweight, and one had chronic diarrhœa.

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SOLAR PROTECTION CREAM.

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AND

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ON August 16, 1958, in THE MEDICAL JOURNAL OF AUSTRALIA, we published a short account of the use of solar lipstick as adopted by the Queensland Radium Institute. In that article we tabulated the relative absorption of erythemal ultra-violet light by various preparations. Two of these were salol protection creams, which are used by this Institute. Subsequently there have been numerous inquiries for the formulæ of the creams from all the States of Australia, and from New Zealand, South Africa, Canada and U.S.A. and even from behind the Iron Curtain.

The use of anti-sunburn cream is, of course, widely practised, and many preparations of this nature are on the market. It has considerable importance in terms of survival by those people exposed in boats during shipwreck and this has been documented many times (Luckiesh, 1946). Salol (phenyl salicylate) acts as a filter for wavelengths just below 3200 Å and for many years applications utilizing salol, sometimes by itself or in combination with tannic acid, have been adopted. For many years the Queensland Radium Institute has prescribed creams containing salol to protect patients who had already been treated for skin cancer or allied conditions and who could not avoid further extensive exposure to sunlight in view of their employment.

We had used salol in barrier creams, vaseline, zinc oxide cream, lanoline and *Spiritus Vini Rectificatus* (as a varnish). The protection afforded by these preparations is excellent, but their main defect lay in the "instability" of the vehicle. Patients objected to many of the ointments in that they were very greasy. When the ointment was satisfactory, it was frequently poor in its adhesive power and easily rubbed or washed off. Some four years ago a protective cream was compounded for our use by the late Mr. Maroney, pharmacist at the Townsville Base Hospital, and this we have used extensively since. The formula of this brown protection cream is as follows:

Brown Protection Cream.

Salol	40 grains
White beeswax	80 grains
Tannic acid	30 grains
Water	96 min.
Borax	5 grains
Olive oil	1 oz.
Concentrated rose water	1 min.

The waxy nature of this cream resists to a considerable extent the effect of moisture, and it adheres to the skin and is not easily displaced. However, it has the disadvantage that the tannic acid constituent stains clothing and towels. Because of this we developed a subsequent cream omitting the tannic acid.

White Protection Cream.

Salol	50 grains
White beeswax	80 grains
Olive oil	270 grains
Water	95 min.
Borax	5 grains
Concentrated rose water	2 min.

This cream is white and non-staining. However, it does not have the same adhesive properties as the previous one, and is inclined to be removed by water or perspiration. We find that it is more suitable for white-collar workers and people who must exercise consideration for their clothing. However, for people who are really exposed to sun hazard in a major degree, for instance, forestry and agricultural workers, cane-cutters and the like, we find the brown cream is excellent. It also serves a very useful purpose as a protection on the beach, because it resists even a moderate degree of moisture by wetting and perspiration without deterioration. In the case of children with delicate skin, this may well offset the disadvantage of the staining of the clothing. The brown cream, when applied, is practically invisible, and thus cosmetically is superior to the other creams. Where it is necessary to be sure that the skin remains protected for a period of several hours, the use of salol (10% to 30%) in vaseline, which remains greasy and sticky, or even zinc oxide cream, which remains white and clearly visible if still in situ, may be preferred. These are just as effective in absorbing the erythemal ultra-violet rays.

The brown cream may, however, have particular advantage in application to local areas of radiation scarring, after the treatment of cutaneous malignant disease. These areas of skin are extremely sensitive to further sun exposure, and the slightly brown cream does also help to disguise the paleness of the scars.

To date, among thousands of patients who have utilized these preparations, we have only once encountered any patient showing any marked degree of sensitivity to the salol. In this case we carried out several tests, utilizing salol in barrier cream, *Spiritus Vini Rectificatus* solution and other preparations, to make sure that it was not the

vehicle to which the patient was sensitive. The sensitivity had arisen after several years of application of the protection creams, and was shown to be due to the salol itself. In view of this we prepared a further special cream, containing menthyl salicylate in place of phenyl salicylate. The formula was as follows:

White Menthyl Salicylate Cream.

Menthyl salicylate	50 grains
Stearic acid	90 grains
Wool fat	9 grains
Triethaneolamine	9 grains
Glycerin	22·5 grains
Water to	500 grains

To date the patient has utilized this alternative cream without demonstrating any signs of sensitivity. Measurements carried out on the transmission of erythemal ultraviolet rays are given below for thicknesses about 0·05 millimetre.

Salol in vaseline	3%
White protective cream	4%
Brown protective cream	2%
White menthyl salicylate cream	10%

Summary.

The formulæ of the salol protection creams currently adopted by the Queensland Radium Institute are noted, and a brief account is given of some of the features of their usage. An alternative cream is also described for such patients as may be sensitive to the salol creams. Some physical measurements of the relative absorption of these creams are given.

Acknowledgements.

We wish to express our appreciation for the cooperation of Dr. A. G. S. Cooper, Queensland Radium Institute, of Professor H. C. Webster, Department of Physics, University of Queensland, and of our colleagues who have assisted in the trial usage and adoption of these creams.

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MALIGNANT MELANOMA.

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IT is my very great pleasure to acknowledge the help and guidance in cancer surgery afforded me by Dr. George Pack of New York, especially on the problem of malignant melanoma.

Malignant melanoma is one of the most common cancers afflicting Australians, and it would seem the combination of our sunny climate and our Anglo-Saxon origin is a marked predisposing factor. Most English authorities stress the rarity and high mortality of this disease. Sir Stanford Cade (1957) records 132 sufferers in a period of 27 years with only 14 (10·6%) surviving over five years at the Westminster Hospital, London. In the United States the condition is more common and less fatal. Dr. George Pack has been able to collect over 1700 cases on the Mixed Tumour Service of the Memorial Center for Cancer, New York. In reviewing 1190 cases up to January, 1951, he found an over-all five-year survival rate of 21·4%. His recent results have improved on this figure.

A review has been made of all cases of malignant melanoma of the skin and mucosa treated at the Royal North Shore Hospital of Sydney during an arbitrary period from January, 1951, to December, 1954. Fifty-three patients were admitted to hospital in these four years, and 21 have survived. An analysis has been made of these 53 patients, and the findings will help to emphasize the mode of behaviour of this tumour and will help to determine a sound method of treatment.

The majority of malignant melanomas originate from pre-existing moles. The pigmented nævus is the most common of all skin tumours, each adult white subject having on the average fifteen moles per person (Pack, Lenson and Gerber, 1952). Probably all nævi are congenital, but they may not make their appearance until later in post-natal life. The hormonal stimuli of puberty and pregnancy are known to cause the sudden appearance of numerous dark moles previously unnoticed or inconspicuous; these stimuli commonly cause pre-existing moles to enlarge and darken.

Nævi are of four types.

1. Intradermal nævi, which account for 75% of all nævi and are the common brown moles. They are often raised, fleshy growths, sometimes hairy, with the næval cells located in the dermis. Malignant melanomas never arise from this type.

2. Junctional nævi, which are usually smooth, hairless and flat or only slightly raised. They vary in colour from brown to black, and the majority are small. The næval cells are found at the dermo-epidermal junction, and about 90% of melanomas arise in junctional nævi.

3. Compound nævi, which contain dermal and junctional elements and which clinically resemble dermal nævi. Only a small proportion (about 10%) of melanomas arise in this type, but it is because of these few that any common mole showing activity should be excised.

4. Blue nævi (Jadassohn), which are composed of spindle-shaped melanoblasts deep in the dermis. These are benign tumours, and there is usually a history of many years' duration without change. On very rare occasions a blue nævus may give rise to a malignant melanoma.

Of 1000 persons submitted to general physical examination (Pack, Lenson and Gerber, 1952), in 39% of cases moles were situated on the trunk, 30% on the upper extremity, 17% on the lower extremity and 14% on the head and neck. It was noted that nævi were uncommon on the genitals, on the feet and under the nails. Melanomas, however, are relatively common in these sites, and this fact adds support to the recommendation of excision of pigmented nævi on the soles, on the genitals and under the nails. Malignant melanomas are most commonly situated on the lower extremities and on the head and neck, in contrast to the distribution of benign pigmented nævi.

The distribution of the lesions of the 53 patients analysed is shown in Table I, and a comparison has been made with other reported series (Table II).

The relationship between complexion and race and the behaviour of moles has been stressed by Pack and in this country by Lancaster (1957). Melanoma is extremely uncommon in the American Negro and other dark races. Only 11% of Americans are natural blondes or redheads, and yet 75% to 80% of melanomas occur in these patients. These people usually have blue or hazel eyes and fair translucent skin, which burns rather than tans on exposure to the sun.

Incidence.

Males and females are said to be affected equally, but in the series of Royal North Shore Hospital patients, there were 21 males and 32 females. The most commonly affected patients were those in the age group 41 to 50 years, but there is another peak at 71 to 80 years (Figure I and Table III). The youngest patient was 14 years of age and the oldest 86.

Symptoms.

An analysis of the symptoms of 51 of the 53 patients under review has been made. Although the majority of melanomas arise in pigmented nævi, in only 12 of the patients with this disease was a mole noted to be present

from birth. The common symptoms are enlargement of a pigmented tumour, bleeding, increase in pigmentation, itchiness, redness around the mole, a lump in the draining lymphatic field, or discharge from the lesion (Figure II). Any of these changes should be regarded as an indication for the excisional biopsy of an offending nævus.

A history of trauma to the pre-existing mole was found in five cases. It seems probable that when a pigmented nævus begins to bother the patient and is subject to repeated trauma, it signifies a malignant change has already developed.

TABLE I.

Distribution of Malignant Melanomas Compared with Benign Pigmented Nævi, Royal North Shore Hospital Series.

Site.	Cases of Malignant Melanoma.	Pigmented Nævi. (Percentage.)
Head and neck ..	15 (30%)	14
Trunk	10 (19%)	39
Upper limb	9 (17%)	30
Lower limb	16 (32%)	17
Unknown	1 (2%)	—

Increase in size, either circumferentially or in height, is the most common symptom and was found in 39 cases. Its significance should not be overlooked. Itchiness of the mole and surrounding redness are worth stressing as less well known symptoms of activity.

Signs.

The majority of melanomas are pigmented — in this series 48.

The amelanotic melanoma is likely to lead to a mistaken clinical diagnosis, and occasionally this mistake is perpetuated by the pathologist. The non-pigmented lesion is thought to explain the occurrence of secondary deposits in lymph nodes with no discernible evidence of a site for the primary tumour. These secondary deposits may be pigmented or non-pigmented.

TABLE II.

Distribution of Malignant Melanoma.

Author.	Number.	Head and Neck. (Percentage.)	Trunk. (Percentage.)	Upper Limb. (Percentage.)	Lower Limb. (Percentage.)	Unknown. (Percentage.)
Affleck	266	21·3	21·0	12·5	24·7	2·0
Webster ..	162	27·1	17·2	14·8	31·4	10·4
Wright	109	26·0	28·0	13·0	27·0	2·0
Cade	132	21·0	16·0	13·0	47·0	3·0
Pack	1190	29·0	28·0	11·0	30·0	2·0
R.N.S.H. series	*53*	*30·0*	*19·0*	*17·0*	*32·0*	*2·0*

Satellite nodules are commonly described, but in this series were present in only five cases.

Spread of Melanoma.

Lymph node involvement by metastasis is exceedingly common in malignant melanoma. It is uncertain how often this occurs, but of the 53 patients under review 19 were known to develop lymph node metastasis at some stage in the disease. It is likely that others developed this complication, but no record is available on this matter. Cade (1957) records 42% of patients developing node involvement who were treated by excision of the primary tumour alone.

Visceral metastases occur quite commonly and are most frequently found in the lungs and liver. Metastases often involve several viscera in one person. Metastases are commonly found in the submucosa of the stomach and small intestine, and in one instance of the Royal North Shore Hospital series, a metastasis was found in the wall of the gall bladder in a patient who had a cholecystectomy performed for typical gall-bladder symptoms.

Melanosis coli is not related to the metastasis from malignant melanoma, but is a pigmentation of the mucosa of the colon and rectum resulting from the habitual use of purgatives containing phenolphthalein.

Melanoma of Special Sites.

There is one instance of a subungual melanoma, which is said to have a higher cure rate than for melanoma in other locations. This form of melanoma is often misdiagnosed, being confused with a subungual hæmatoma or an epidermophytosis. Amputation of the affected digit is the treatment of choice.

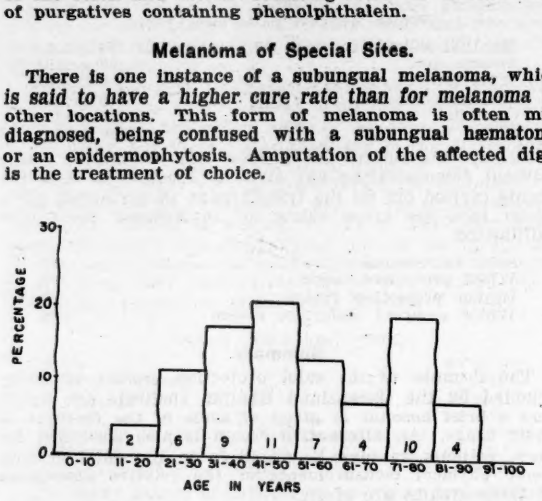

FIGURE I.

Incidence of melanoma at The Royal North Shore Hospital of Sydney, 1951 to 1954. There were 21 males and 32 females.

Ano-rectal melanoma was found in about 2% of cases. The diagnosis is often delayed or mistaken. Widespread dissemination by lymphatics and blood stream seems to take place early and the prognosis is poor. Excision of the rectum with a "flush tie" of the inferior mesenteric artery together with bilateral dissection of the inguinal lymph nodes in continuity seems to give the best chance of a cure.

TABLE III.

Age Distribution of Malignant Melanoma.

Author.	No.	Age Group in Years. (Percentage.)							
		0 to 10.	11 to 20.	21 to 30.	31 to 40.	41 to 50.	51 to 60.	61 to 70.	Over 71.
Affleck ..	266	—	1·8	15·5	20·0	15·5	27·2	14·7	10·2
Webster	162	6·8	3·4	10·3	19·8	18·5	14·4	17·8	8·9
Wright	109	1·0	1·0	8·2	11·0	21·8	15·5	21·8	19·3
Cade ..	*132*	—	*6·8*	*22·0*	*18·9*	*18·9*	*18·9*	*6·8*	*7·7*
Pack ..	718	—	3·8	20·1	20·1		34·8	23·4	
R.N.S.H. series	53	—	3·8	11·7	17·0	20·7	13·2	7·6	26·4

Melanoma of the genitals is said to be relatively common, but no case was found in the series under review. The numerous venous and lymphatic plexuses in this region are responsible for the early venous and lymphatic metastasis, and for a poorer prognosis.

Pre-pubertal melanoma is a type of pigmented nævus which bears an extremely close resemblance to malignant melanoma, both clinically and histologically (Pack, 1948). It has, however, a benign course and does not metastasize. At the same time it should be remembered that there are malignant melanomas arising in children after puberty, which go on to metastasize and lead to death.

The hormonal stimulus of pregnancy activates the growth of malignant melanoma. The coexistence of pregnancy and active malignant melanoma indicates a grave prognosis. The treatment should be radical and

aggressive, but there is no value in terminating the pregnancy. Young women who have had melanomas treated should avoid pregnancy for three to five years. One young woman in this series showed activation of the disease during pregnancy and presented with a lymph node metastasis.

Prophylaxis.

The prophylactic excision of pigmented moles in certain situations has been stressed, and it is recommended that surgical removal of the following lesions be carried out: (i) all pigmented lesions on the palms, soles and genitals and under the nails; (ii) all ulcerated pigmented lesions; (iii) pigmented lesions at sites subjected to repeated pressure and friction; (iv) pigmented lesions with irregular borders or satellites; (v) suspicious nævi in children.

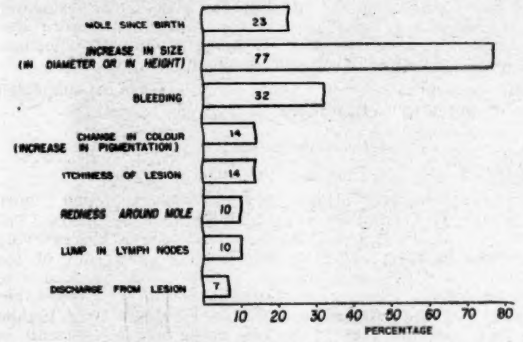

FIGURE II.
Symptoms of melanoma.

Surgical Treatment.

Although the majority of malignant melanomas can be identified by inspection, confusion may occur with seborrhœic keratosis, squamous and basal cell carcinomas, pigmented neurofibroma, sclerosing hæmangioma, papilloma, verrucæ and benign nævi.

Confirmation of the diagnosis is made by excisional biopsy in every case. Once the diagnosis is established the surgeon must perform an extremely wide excision of the tumour and the skin that surrounds it. Cosmetic restoration is not as important as safety, which is afforded by wide and deep surgical excision. The excision should be deep enough to extirpate the adjoining lymphatics in the neighbourhood of the melanoma and thus include not only the skin but also the fat and deep fascia. A margin of 4 to 6 cm. around the tumour is recommended. Wherever possible, the principle of excision *en bloc* of the primary tumour in continuity with the draining lymph nodes should be carried out. Whether this is practicable or not depends on the site of the primary tumour, but the high incidence of lymphatic metastasis makes it a desirable objective.

The method formerly advocated of excision of a strip of fascia and skin from primary tumour to lymph nodes is unsound. If the primary tumour is so situated that the dissection of the lymph nodes in continuity is not practicable, and this applies to lesions distal to the knees or elbows, then prophylactic dissection of clinically non-affected nodes is not recommended. These nodes may act as filters if left *in situ*; also the lymphœdema and lymph stasis which follow such a prophylactic dissection lead to the imprisonment of any free melanoma cells in the limb, and these make their appearance as multiple subcutaneous deposits along the line of the lymphatics.

Should the draining lymph nodes appear to be clinically involved, then radical dissection is the treatment, no matter where the primary tumour is situated. Such a radical dissection may be discontinous or in continuity, depending upon the site of the melanoma.

Pack states that radical amputation of the limb with lymph node excision may be a preferable form of treatment in cases in which excision *en bloc* is not possible. It is the only method of removing the lymphatics between the site of the primary tumour and the affected lymph nodes.

Results.

Considering the group of 53 patients treated by a variety of surgeons at the Royal North Shore Hospital, there are 19 alive and apparently free of disease four years later; two are alive, but known to have active disease in addition; 24 have died and eight are untraced. These results are apparently better than other reported series. All cases have been histologically confirmed, although seven are described as early changes of malignant disease in a benign nævus. Whether such lesions would have been included by other authors is not known.

Of the 53 patients, 38 are eligible for five-year follow-up, and of these 14 are alive and well and one is alive with active disease, and the remaining 23 are either dead or untraced. There would seem to be little difference in the figures for four-year and five-year survivals. Malignant melanoma is unpredictable in its behaviour, but of those patients who die, the majority perish in the first two years. Table IV compares the results obtained by various authors after five years.

TABLE IV.
Comparison of Five-Year Survival Rates.

Author.	Number of Cases.	Percentage of Five-Year Survivors.
Affleck	170	11
Webster	—	—
Wright	70	28·6
Cade	122	10·6
Pack	575	21·4
R.N.S.H. series	38	36·8

On further investigation of these 53 patients, they may be grouped into three varieties. There are those who received treatment from the start at this hospital — 32 in all. The results in this group are best, with 15 who are alive and well four years later.

In the second group are those patients who have had some form of treatment more than one month prior to admission to this hospital. There were 16 in this group, two of whom had been initially treated with radium and four with cautery or diathermy. Five of these six persons had local recurrence when admitted to hospital. The remaining ten had surgical excision of their original lesion, and six of these presented with local recurrence. This makes 11 in all who presented with local recurrences, indicating inadequate local treatment previously. Four others presented with nodal metastasis and one with disseminated metastasis. Of this group of 16, only four are alive and apparently free of disease. This group reveals that beauticians and chiropodists are not the only people responsible for tinkering with pigmented lesions.

The third group comprises five patients who were considered inoperable on admission to hospital, because of disseminated metastases. All received treatment prior to admission, varying from five months to five years previously. None of this group are now alive.

Of the 48 patients who received treatment, 37 had no lymph node involvement when first examined; of these, 18 are alive four years later (one with active disease) and 19 are dead. The remaining 11 patients had lymph node involvement when first examined; of these, three are alive (one with active disease) and eight are dead.

It was noted that 13 of the 32 females and six of the 21 males are alive and free of disease. It is generally stated that the prognosis in females is better than in males.

The influence of location of the primary tumour upon end results has not been determined in this group, but Pack found the best results in those in whom the tumour was situated on the palm or sole, under the nails or on the leg. The worst results are with tumour of the mucosa, anal tumour or oro-nasal tumour.

Summary.

It is desired to stress again the prophylactic excision of suspicious moles and to advocate radical excision as the primary form of therapy in established cases of malignant melanoma. If the primary tumour is situated relatively close to the draining lymphatics, an excision *en bloc* of the tumour, the lymph nodes and the intervening tissues is carried out either prophylactically, if the nodes are clinically not involved, or therapeutically, if the nodes are enlarged. If the primary tumour is sited well away from the lymph nodes, these are observed and a block dissection is performed only when they are clinically involved by disease.

As the results of treatment of this latter group are so bad, there may be a case for ablation of the limb with lymph node excision, as advocated by Pack.

The results of treatment of 53 patients at the Royal North Shore Hospital of Sydney are recorded.

Acknowledgements.

I wish to thank the General Medical Superintendent of The Royal North Shore Hospital of Sydney, Dr. Wallace Freeborn, for making available the records of the 53 patients under review in this paper. I am grateful to Dr. Brian Hartnett for his help in the follow-up of these patients.

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THE USE OF "HIBITANE" IN THE CULTURE OF SPUTUM FOR MYCOBACTERIUM TUBERCULOSIS.

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A WIDELY-USED method for the culture of sputum for *Mycobacterium tuberculosis* is that of Petroff (1915) which, many workers claim, results in the destruction of a large fraction of the mycobacterial population. This criticism has also been levelled at many of the numerous alternative methods to that of Petroff, and there have been constant attempts to improve upon them.

Davies, Francis, Martin, Rose and Swain (1954) state that "Hibitane" (Imperial Chemical Industries Ltd.) inhibited the growth of *M. tuberculosis* in the medium of Dubos and Middlebrook (1945), but that it was inactive at 1/1000 on Löwenstein's medium. In view of these findings, it seemed worthwhile to investigate "Hibitane" as a selective decontaminating agent for sputum before it was cultured on Löwenstein's medium.

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It was assumed that the efficiency with which "Hibitane" would decontaminate sputum would be largely determined by the consistency of the sputum. In some early experiments, a preparation of papain in phosphate buffer was tried as a liquefying agent. Rather surprisingly, however, it was found that vigorous shaking of the sputum with phosphate buffer alone resulted in a product sufficiently liquid and homogeneous to run through a fine Pasteur pipette, and that no better results were obtained when papain was included during shaking. With adequate shaking, it was found possible to liquefy the most mucoid and purulent specimens.

Specimens of sputum, homogenized by shaking, were divided into two equal portions, and some reasonably quantitative comparisons were made between the recoveries of the tubercle bacillus after treatment by the Petroff and "Hibitane" methods.

After a few preliminary experiments, a concentration of "Hibitane" and a period of shaking with it were selected for the work described here. A few experiments were also carried out to test the effect of more prolonged exposures of sputum to the "Hibitane" concentration selected.

The specimens were collected from known or suspected case of pulmonary tuberculosis.

Methods.

Preliminary Homogenization of Sputum.

It was observed that sputum was liquefied more efficiently by oscillatory than by vibratory agitation. The action of the "Dynamax" shaker (Ainsworth Engineering Co.) was in this respect more effective than that of the well-known "Microid" model. At full speed, the arms of the "Dynamax" shaker oscillate at about 10 strokes per second and the effective amplitude is about four inches. The mucoid material is broken down as the column of fluid is flung repeatedly into the ends of the container. Some specimens could be liquefied with the addition of little or no fluid, whereas the more viscous and purulent sputum required the preliminary addition of fluid before shaking. Universal bottles were used for the procedure, and the greatest volume of sputum used was about 8 ml. This was transferred to the universal bottle and the volume made up to approximately 15 ml. with phosphate buffer (pH 7·0). The mixture was then shaken at full speed for 5 to 10 minutes after which treatment it became a free-running fluid with small particles which gradually settled out. Two five-millilitre aliquots were transferred to separate universal bottles for treatment by the "Hibitane" and Petroff methods.

Petroff Method.

To the 5 ml. of homogenized sputum, 5 ml. of N/10 caustic soda solution was added, and the mixture was shaken at about half speed on the shaker for two to five minutes. About 2 ml. of froth-free fluid were decanted into another universal bottle, two drops of brom-thymol blue were added and the fluid brought to neutrality with N/10 hydrochloric acid. Each of three Löwenstein slopes was flooded with three drops of the material from a Pasteur pipette.

"Hibitane" Method.

To the 5 ml. sample of homogenized sputum, 10 ml. of phosphate buffer were added and the bottle was shaken at full speed for five minutes. Then 0·5 ml. of "Hibitane Concentrate" (Imperial Chemical Industries Ltd.) was added and shaking continued for a further three minutes. The final concentration of "Hibitane" in the preparation was 1:1500. Löwenstein slopes were inoculated as for the Petroff method. In each method the slopes were inoculated with comparable volumes of the original sputum.

Assessment of Growth.

With both methods, mycobacterial growth on the slopes varied from a few isolated colonies to confluency. No attempt was made to distinguish fine differences between comparable slopes of the two methods, and unless the difference was at least two-fold, it was recorded as nil.

In many cases there were differences which were assessed as at least ten-fold.

Prolonged Exposure of Sputum to "Hibitane".

After the sputum was shaken for three minutes with "Hibitane" as described previously, two serial ten-fold dilutions were made in a 0·5% bovine albumin solution and three drops of each dilution were sown on Löwenstein medium in flasks (three flasks per dilution). The undiluted material was then left on the bench (about 25° C.) and sampled again at various intervals after gentle shaking by hand.

The Löwenstein flasks were prepared by inspissating 10 ml. volumes of the medium on the bottoms of 100 ml. Erlenmeyer flasks. An advantage of flasks over plates is that they may be dried through the cotton wool plugs and are thus not so readily contaminated. On the other hand, the colonies cannot be counted so readily in flasks as they can on plates.

Results and Discussion.

The contamination rate for the "Hibitane" cultures (Table I) is obviously far too high for routine work. However, it may well be reducible by (*a*) more efficient liquefaction of the sputum before the "Hibitane" is added, (*b*) a longer period of shaking with the "Hibitane" and/or a higher concentration of it, (*c*) the inclusion of other selective antimicrobial substances. Some knowledge of the "Hibitane" insensitive species of the flora of sputum would permit a more critical approach to this aspect of the problem. The results shown in Table II indicate that the duration of the shaking with "Hibitane" may be lengthened considerably without damage to the tubercle bacillus. Unfortunately, in these experiments the treated sputum was not diluted far enough to obtain easily countable numbers of colonies.

TABLE I.

Analysis of Results of 140 Specimens of Sputum Cultured by "Hibitane" and Petroff Methods.

Results.	Number.	Percentage.
Both results negative	24	17
Both results positive	101	72
Petroff, positive; "Hibitane", negative	3	2
"Hibitane", positive; Petroff, negative	0	0
Comparison invalidated by:		
Gross contamination of "Hibitane" slopes	12	9
Gross contamination of Petroff slopes..	0	0
Total	140	100

TABLE II.

Effect of Prolonged Exposure of Sputum to "Hibitane" (1 : 1500) (One of Three Similar Experiments).

Time of Exposure to "Hibitane". (Minutes.)	Growth in Löwenstein Flasks.		
	10^{0}	10^{-1}	10^{-2}
3	C[1]	H[2]	*c.* 200 colonies
30	C	H	*c.* 200 colonies
120	C	H	*c.* 200 colonies

[1] C, confluent growth.
[2] H, hundreds of colonies.

In all three comparisons where the Petroff results were positive and the "Hibitane" results negative (Table I), the growth on the Petroff slopes was scanty. Although the number of such cases was small, it does appear possible that some "lightly positive" cases would be missed by the "Hibitane" method in routine work. It is, however, difficult to reconcile these comparisons with the results in Table III, which show a decided trend towards heavier recoveries by the "Hibitane" method. Clearly many more comparisons are necessary before firm conclusions can be reached.

TABLE III.

Analysis of 101 Comparisons (Table I) where Both Petroff and "Hibitane" Results were Positive.

Results.	Number.	Percentage.
Recovery on "Hibitane" slopes heavier than on Petroff slopes	36	36
Recovery on Petroff slopes heavier than on "Hibitane" slopes	10	10
Recoveries similar on both sets of slopes	55	55
Total	101	100

"Hibitane Concentrate" contains, in addition to "Hibitane" diacetate, a wetting agent (alkylarylpolyether-alcohol), an anti-rusting agent (sorbitol) and a red dye. It is not yet known what part, if any, these ingredients play in the reactions under consideration.

Concentration of the organisms by centrifugation has not yet been attempted; some investigation of this would seem worth while.

It is perhaps not widely appreciated how readily sputum can be liquefied by simple vigorous shaking, and undoubtedly it can be done more efficiently and rapidly than has been done here. The procedure should prove useful where even distribution of soluble and particulate elements is desirable before specimens are divided into aliquots for testing various treatments. Also, simple shaking may well be sufficient treatment for homogenizing sputum before cultures are made for pathogens other than the tubercle bacillus; this offers an alternative to the lengthier enzymatic treatments (Rawlins, 1953). Where these latter treatments are necessary, they may well be accelerated by vigorous shaking of the type described here.

This work is regarded only as an exploratory investigation both of a mechanical method of homogenizing sputum and of a new method of culturing sputum for the tubercle bacillus. The results suggest that further studies along similar lines would be profitable.

Summary.

One hundred and forty specimens of sputum were homogenized by vigorous shaking with phosphate buffer, and aliquots were cultured on Löwenstein slopes for *M. tuberculosis* after treatment with (*a*) sodium hydroxide and (*b*) "Hibitane". In general the results with the former method were better than with the latter, in that the contamination rate was less and a slightly higher percentage of positive results to cultures was obtained. However, in many comparisons where both methods yielded positive results, the recoveries after the "Hibitane" treatment were heavier than those after sodium hydroxide. In some semi-quantitative experiments, there was no reduction in the myobacterial population of sputum exposed for as long as two hours to "Hibitane" at a concentration of 1:1500.

Attention is drawn to the liquefaction of sputum, which can be achieved by simple vigorous shaking.

Acknowledgements.

We should like to thank Dr. A. F. Krassay and Mrs. C. Horvath for their kind help during this work.

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DAVIES, G. E., FRANCIS, J., MARTIN, A. R., ROSE, F. L., and SWAIN, G. (1954), "1:6-DI-4'Chlorophenyldiguanidohexane ('Hibitane'). Laboratory Investigation of a New Antibacterial Agent of High Potency", *Brit. J. Pharmacol.*, 9: 132.

DUBOS, R. J., and MIDDLEBROOK, G. (1947), "Media for Tubercle Bacilli", *Amer. Rev. Tuberc.*, 56: 334.

PETROFF, S. A. (1915), "A New and Rapid Method for the Isolation and Cultivation of Tubercle Bacilli directly from Sputum and Fæces", *J. exp. Med.*, 21: 38.

RAWLINS, G. A. (1953), "Liquefaction of Sputum for Bacteriological Examination", *Lancet*, 2: 538.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"South Pacific Commission Tuberculosis Conference. Background Papers"; 1958. Noumea: South Pacific Commission. 10½" × 7½".

Background papers of a conference held in Pago Pago, American Samoa, in November, 1958.

"Tuberculosis in the South Pacific: A Selected List of Bibliographical References (with Annotations and Background Notes)", compiled in the Health Section of the South Pacific Commission; 1958. 10½" × 7½", pp. 52. Price: not stated.

A collection of bibliographical references to be used in conjunction with the South Pacific Commission Tuberculosis Conference Background Papers.

"Aortic Valvular Diseases Studied by Percutaneous Thoracic Aortography", by Per Ödman and Jan Philipson: *Acta Radiologica*, Supplement 172; 1958. 9¼" × 7", pp. 60, with 21 illustrations. Price: Sw.Kr. 25.

An account of work carried out at the Roentgen Department I, in collaboration with the Heart Clinic, at Södersjukhuset, Stockholm.

"On Tolerance of Brain Tissue and Sensitivity of Brain Tumors to Irradiation", by Martin Lindgren: *Acta Radiologica*, Supplement 170; 1958. Stockholm: Acta Radiologica. 9¼" × 7", pp. 73 and 30 illustrations. Price: Sw.Kr. 25.

From the Departments of Radiotherapy and Pathology, University Hospital, Lund, Sweden.

"Late Results of Radium Therapy in Cervical Carcinoma: A Clinical-Statistical Study on 798 Patients Treated at The Radium Centre, Copenhagen, During the Period 1922-1929", by Bent Sorensen; *Acta Radiologica*, Supplement 169; 1958. Stockholm: Acta Radiologica. 9¼" × 7", pp. 190, with 44 illustrations and 41 tables. Price: Sw.Kr. 25.

The title is self-explanatory.

"World Directory of Venereal-Disease Treatment Centres at Ports", Geneva: World Health Organization. 9¼" × 6", pp. 162. Price: not stated.

The application of the International Agreement of Brussels, 1924, respecting facilities to be given to merchant seamen for the treatment of venereal diseases.

"Handbook of Diet Therapy", by Dorothea Turner; Third Edition; 1959. Chicago: The University of Chicago Press. 9" × 6", pp. 237. Price: $5.00.

The book is designed to provide aid in naming, defining and describing therapeutic diets in line with dietetic principles.

"Dynamic Psychopathology in Childhood", edited by Lucie Jessner, M.D., and Eleanor Pavenstedt, M.D.; First Edition; 1959. New York and London: Grune & Stratton. 9" × 5¾", pp. 326 with illustrations. Price: $8.75.

Contains 12 papers from various sources.

"Expert Committee on Health Statistics, Sixth Report, Including Third Report of the Sub-Committee on Cancer Statistics"; World Health Organization Technical Report Series, No. 164; 1959. Geneva: World Health Organization. 9¼" × 6¼", pp. 44. Price: 1s. 9d.

Report of a committee which met in September-October, 1958.

"Expert Committee on Plague, Third Report"; World Health Organization Technical Report Series, No. 165; 1959. Geneva: World Health Organization. 9¼" × 6¼", pp. 44. Price: 1s. 9d.

The report of a committee which met in September, 1958.

"Expert Committee on Respiratory Virus Diseases, First Report"; World Health Organization Technical Report Series, No. 170; 1959. Geneva: World Health Organization. 9¼" × 6¼", pp. 60. Price: 3s. 6d.

The report of a committee which met in August, 1958.

"Adolescent Rorschach Responses: Developmental Trends from Ten to Sixteen Years", by Louise Bates Ames, Ph.D., Ruth W. Métraux, M.A., and Richard N. Walker, Ph.D.; First Edition; 1959. New York: Paul B. Hoeber, Inc. 9¼" × 6", pp. 327. Price: $8.50.

A study of the responses of 100 children.

"Human and Veterinary Medicine", edited by S. W. Simmons; Authors: W. J. Hayes Jr., S. W. Simmons and E. F. Knipling; 1959. Stuttgart: Birkhäuser Verlag Basel. 9¼" × 6¼", pp. 572, with many illustrations. Price: sFr. 66 (Switzerland).

Contains chapters on the pharmacology and toxicology of DDT, the use of DDT insecticides in human medicine and the use of DDT in veterinary medicine.

"Dose Distributions in Arc Therapy in the 200 to 250 KV Range: Systematic Measurements in Homogeneous Phantoms with the Beam Direction Perpendicular to the Oscillation Axis", by Olov Dahl and Karl Johan Vikterlöf; *Acta Radiologica*, Supplement 171; 1958. Stockholm: Acta Radiologica. 9¼" × 7", pp. 250, with many illustrations. Price: Sw. Kr. 35.

The report of an investigation conducted at Radiumhemmet and the Institute of Radiophysics, Stockholm.

"The Principles and Practice of Electrotherapy and Actinotherapy", by Bryan O. Scott, M.R.C.S., L.R.C.P., D.Phys.Med.; 1959. London: William Heinemann Medical Books Limited. 8½" × 5¼", pp. 322, with 168 illustrations. Price: 27s. 6d. (English).

Primarily written as a text-book for students of physiotherapy.

"Pathology of Tumours of the Nervous System", by Dorothy S. Russell, Sc.D., M.A., M.D., F.R.C.P., LL.D., and L. J. Rubinstein, M.D.; 1959. London: Edward Arnold (Publishers) Limited. 9¼" × 7", pp. 328, with 280 illustrations. Price: 70s. (English).

This book is designed for practising pathologists, postgraduate students, neurologists and neurosurgeons.

"Medical Terms: Their Origin and Construction", by Ffrangcon Roberts, M.A., M.D., F.F.R.; Third Edition; 1959. London: William Heinemann Medical Books, Limited. 7¼" × 4¼", pp. 100. Price: 6s. (English).

An examination of the language of medicine.

"Food Inspection Notes: A Handbook for Students", by H. Hill, F.R.S.H., F.S.P.H.I., A.M.I.P.H.E., and F. Dodsworth, F.R.S.H., F.S.P.H.I., M.Inst.P.C.; Fifth Edition; 1959. London: H. K. Lewis & Company, Limited. 6½" × 4", pp. 128. Price: 10s. 6d. (English).

A small book for public health students by two practising public health officers.

"A Synopsis of Skin Diseases", by Bethel Solomons, Jun., M.A., M.D., F.R.C.P.I.; 1959. Bristol: John Wright & Sons, Limited. 7¾" × 4¾", pp. 304, with 14 illustrations. Price: 30s. (English).

A condensed book "for the busy practitioner, for those who have to revise the subject rapidly, and also for the student about to take his final examination".

"Elementary Medical Therapeutics", by G. F. Walker, M.D., F.R.F.P.S. (Glas.), D.C.H., M.R.C.P. (Lond.); 1959. Bristol: John Wright & Sons, Limited. 7¼" × 4¾", pp. 64. Price: 7s. 6d. (English).

The elements of drug therapy for senior students and resident medical officers.

"The School Health Service", by S. Leff, M.D., D.P.H., and Vera Leff; 1959. London: H. K. Lewis & Company, Limited. 8¼" × 5¼", pp. 324, with 2 illustrations. Price: 30s. (English).

An examination of the School Health Service in Great Britain.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 26, 1959.

THE CHROMOSOMES OF MAN.

THREE ARTICLES have recently appeared in *The Lancet* which are described, in a leading article in the same issue, as "some of the first fruits of a technical advance which may revolutionize human genetics".[1] It is pointed out that hitherto virtually nothing has been known about the physical basis of heredity in man which could be demonstrated by direct observation; our knowledge of the mechanism of inheritance has been entirely inferred from what has been observed in lower organisms, notably that insignificant but extremely useful little fly, *Drosophila*. Possessing only four pairs of chromosomes, as well as being extremely easy to handle and propagate, *Drosophila* has long been the plaything of geneticists. The general outline of this work is now well known, and we have almost ceased to marvel at the ingenuity which has enabled geneticists to map individual chromosomes, so that the exact position of the gene controlling various factors can be pinpointed. Until very recently, technical difficulties had prevented the application of these methods to the study of inheritance in man. However, several advances in cytological technique during the past decade have together now made it possible to obtain a picture of the chromosomes of a human cell caught in mitosis, looking like a collection of clothes pegs scattered on the ground. They can be counted and arranged in pairs, and any anomalies of number or form can be noted. The first result of these new techniques was to demonstrate that the normal diploid number of chromosomes in man is 46, not 48 as we were once taught. The next step, of which the three papers mentioned at the beginning of this article are among the first examples, is the demonstration of significant deviations from that number, and the correlation of such deviations with clinically recognizable genetic abnormalities. Two research groups have been so far mainly responsible for developments in this field: one is that led by C. E. Ford of the Medical Research Council Radiological Research Unit at Harwell, the other is the Edinburgh group. Both employ a technique worked out by Ford and his colleagues in which a sternal marrow culture is used as the raw material in which the dividing cells are sought; this is said to be much simpler and to provide better material than the laborious tissue-culture methods previously employed.

The first announcement of the demonstration of the association of a deviation from the normal chromosome number in man with a genetic abnormality appears to have been in a paper by Patricia Jacobs and J. A. Strong,[1] of Edinburgh, in which they report the case of a patient who was clinically an apparent male with gonadal dysgenesis and gynæcomastia, who was cytologically chromatin-positive (i.e., he provided an example of chromatin-positive Klinefelter's syndrome), and who had a chromosome number of 47. Unfortunately the X chromosomes in man are not easy to identify, but there are good reasons for supposing that in this case the additional chromosome is accounted for by the presence both of two X chromosomes and of a Y chromosome, the sex-chromosome formula being XXY. Since then this observation has been repeated in other cases of Klinefelter's syndrome, and Ford and his colleagues[2] have also demonstrated a chromosome number of 45 in a case of Turner's syndrome, the patient apparently having only a single X chromosome and no Y chromosome. One of the incidental conclusions which may be drawn from these discoveries is that the chromatin body, which is the basis of the cytological diagnosis of nuclear sex, does in fact represent the presence of two X chromosomes, as has been supposed on purely empirical grounds.

It might perhaps have been anticipated that some of the inheritable anomalies of sex would turn out to be associated with identifiable anomalies in the chromosomes. Therefore the demonstration that mongolism is similarly associated is perhaps the most remarkable achievement of the new technique to date. This was first reported by three French workers, using tissue cultures from connective tissue, and has now been confirmed by both the British groups. The Edinburgh[3] group have studied three male and three female mongoloid defectives, and in each case established a chromosome number of 47. The supernumerary chromosome is a small chromosomal body resembling the Y chromosome in size, though it seems unlikely that it has any other connexion with it. Ford and his colleagues[4] report the case of a patient exhibiting both mongolism and the Klinefelter syndrome. In this case 48 chromosomes were demonstrated, the patient having both the XXY constitution associated with the chromatin-positive Klinefelter syndrome and the small supernumerary chromosome associated with mongolism. From now on the field is wide open, and the next few years will undoubtedly see a great extension of our knowledge of the chromosomes of man, which can hardly fail to throw new light in unexpected places.

[1] *Lancet*, 1959, 1: 715 (April 4).

THE HORSE MUST DRINK.

MEDICAL GRADUATES normally remain members of their universities no matter how far afield they may go. Moreover, in most universities they share with their fellow graduates of other faculties the right to elect a substantial number of members of the governing body. This obtains in the Universities of Sydney and Melbourne, in both of which elections will be held this year—in Sydney on November 12, 1959, an election of 10 Fellows (members of the Senate) by graduates, and in Melbourne an

[1] *Nature*, 1959, 183: 302 (January 31).
[2] *Lancet*, 1959, 1: 711 (April 4).
[3] *Ibidem*: 710.
[4] *Ibidem*: 709.

election of five representatives of graduates on the University Council.

All medical graduates of these universities are urged to exercise their rights and discharge their responsibilities by voting in these elections, and so ensure that their profession is adequately represented. In New South Wales at least, the apathy of the medical profession towards previous elections of this kind has been disturbing and should not be allowed to continue. At the last election of the Senate of the University of Sydney in 1954, only 13% of the 4600 graduates of the medical faculty voted. The proportion of all graduates who voted was 21%. The highest proportion was in the Arts-Law group (28%), with Science and Engineering next (23%). As might be expected, this voting was reflected in the results. Of the 10 people elected, three were Masters of Arts, three were in the legal profession, one was a scientist, one was a teacher, one was an economist and one was in the medical profession. This one representative of the medical profession, it should be noted, was the Chancellor, who with his great personal popularity topped the poll; but one representative is not enough for a profession whose members make up over one-fifth of the total graduate body. Not that there was any shortage of medical candidates. On the contrary, they comprised 12 of the 35 candidates—a fact which in itself would tend to weaken the medical vote by spreading it more widely—and included leading members of the profession.

This situation is anomalous. Our universities are developing with phenomenal speed in size and activity, and none more so than the University of Sydney. Its medical graduates have a plain duty to their own faculty as well as to the university to see that they are adequately represented on the Senate. Voting is convenient, as it may be done in person or by post, but the individual graduate must make the slight effort involved. If he does not vote in person (0·7% of medical graduates did so in 1954), he must apply for a voting paper (18% did so in 1954), fill it in and return it (13% did so in 1954). That is all. The University authorities do their best by sending a circular letter and an application form for a postal vote to every graduate on the mailing list, but they can do no more. They can only lead the horse to the water. He must do his own drinking.

Current Comment.

ENDOTHRIX TINEA CAPITIS AMONG THE ABORIGINAL AND PART-ABORIGINAL POPULATION OF SOUTH AUSTRALIA.

In various parts of the world a high incidence of chronic tinea capitis has been recorded among the poorer classes, and these cases pose a serious public health problem. The countries bordering the Mediterranean, Asia Minor, Rumania, Poland and South Russia have all reported a high incidence (40% to 70%) of infection due to *Trichophyton violaceum*, which causes one of the most stubborn fungous infections of the scalp. In most other countries, including Australia, infections by *T. violaceum* have been considered to form 1% or less of cases of tinea capitis, and to involve recent migrants for the most part. G. F. Donald's report in this issue (see page 435) is therefore doubly disconcerting, because he has shown not only that about a third of the part-aboriginal children from two of the government stations in South Australia are suffering from chronic tinea capitis, but also that about half of these infections are caused by *T. violaceum*. In Australia it is the aboriginal and part aboriginal who has the lowest living standard. The incidence of *T. violaceum* in Europe and Asia has increased as the living conditions have worsened, and the uncovering of an endemic focus in South Australia is another argument for the urgent need to improve the living standards and personal hygiene of the part-aboriginal Australian. We do not know how and when tinea capitis was introduced among these underprivileged people, but its future spread is bound up with the larger question of their total welfare. It is important that the feeding of all aborigines is improved, that good housing with water is available for regular washing, and that proper sanitation is provided. On welfare officers and mission personnel falls the obligation to appreciate the needs of the aborigines and to instruct these people where necessary. The present tendency to leave many aboriginal children untreated is to be deplored. The Education Department of South Australia has stated that children with untreated tinea are to be excluded from school, and increased awareness of these infections and the exclusion of untreated children will be essential factors in the control of this chronic form of tinea capitis, which can last for years, if not for life. Perhaps the wise precaution of the Adelaide Children's Hospital, mentioned in Donald's report, should be extended to cover all aboriginal and part-aboriginal children attending school or adolescents seeking employment.

GUY'S HOSPITAL REPORTS: RICHARD BRIGHT NUMBER.

To commemorate the centenary of the death of Richard Bright, a special number of *Guy's Hospital Reports* (Volume 107, No. 4) was issued last year under the editorship of Sir Russell Brock. It is entirely devoted to a symposium on every conceivable aspect of the disease which is eponymously termed to remind us of the man who first demonstrated conclusively the relationship between dropsical effusions, the presence of albuminous urine and structural changes in the kidney. Coagulable protein had been discovered in the urine of patients late in the eighteenth century, and the phenomenon had been reported with more scientific acumen in 1811 by W. C. Wells of St. Thomas's Hospital, London; two years later Dr. John Blackall, a capable physician who practised at Exeter, noted its presence in cases of scarlet fever. But the sustained observations of Richard Bright from the time he was appointed physician to Guy's Hospital in 1820 were so thorough, accurate and systematic that the ætiology, clinical manifestations and pathology of Bright's disease at last became clearly defined and well understood.

To this special number of the *Guy's Hospital Reports* 20 separate articles have been contributed by specialists with expert knowledge in that domain of the medical or allied sciences having some bearing on normal kidney function or disease. The authors have been purposely chosen by the editor in order to give a complete and comprehensive survey of the initial studies of Bright in the wards and post-mortem room of the hospital from 1820 to his retirement in 1843, and to assess the work carried on by his colleagues and successors, Addison, Hodgkin, Wilks and Gull, who helped to build up the legend associated with "the great men of Guy's". Most of the later articles deal scientifically with the clinical, pathological, radiological, biochemical, bacteriological, histological, paediatric and obstetrical aspects in modern concepts of kidney function and disease. The first four articles may well be appreciated by the scientific physician, but they are certainly of great interest to the medical historian. Dr. H. C. Cameron has written an excellent account of Bright's epoch-making

discoveries at Guy's, and this is followed by two articles by Sir William Hale-White, who gives a delightful summary of Bright's investigations to clarify knowledge of other important organic diseases as well as those of the kidney. In the fourth article, Dr. W. N. Mann describes the changing concepts of a century on renal disease, and leaves us with the feeling that there is still much to be learnt about this very vital subject.

It seems an anomaly that no full and definitive biography of Richard Bright has yet been published. He stands out above so many others as an exceptionally fine character, a scientific physician who initiated teamwork in studying the natural history of disease, a man of infinite talent as an artist, an astute observer and a fluent writer on a variety of topics other than medicine. Altogether he is one of the greatest figures in that period of past achievement which stimulated the rapid development of modern scientific medicine.

THE "SILENT CORONARY".

SINCE the clinical recognition of acute myocardial infarction precordial pain has been recognized as one of the most important symptoms. It was soon realized, however, that myocardial infarctions could occur without any manifestation of pain. These cases were recognized either at post-mortem examination or from serial electrocardiographic changes. Very varying results were obtained by different observers as to the relative frequency of painless infarction. The patients investigated in these examinations were all in hospital, presumably because of some serious illness, and patients with mild or atypical manifestations of myocardial infarction would probably be missed. In order to obtain some idea of the frequency of the condition in the general community the results obtained in the Heart Disease Epidemiology Study, Framingham, Massachusetts, have been investigated. The findings are described by J. Stokes III and T. R. Dawber.[1] Between October, 1948, and March, 1953, a total of 4469 randomly selected subjects and 750 volunteers, all between the ages of 30 and 59 years, underwent a complete cardiovascular examination. All subjects who had or might have had a myocardial infarction were excluded, but persons with angina alone were accepted. Most of the subjects returned every two years for a follow-up examination between 1950 and 1957. Each subject was examined very thoroughly by at least one physician, and by two if there was any history of pain which might be angina pectoris. A 12-lead electrocardiogram was recorded from each subject and interpreted by experts.

When the subject, in the course of an acute illness, consulted a physician who diagnosed acute myocardial infarction, the illness was considered to have been "recognized". When the subject showed electrocardiographic evidence of myocardial infarction, but reported no illness or very mild symptoms for which a physician was not consulted, the infarction was considered to be "unrecognized". During the seven-year period 29 subjects died with a diagnosis of myocardial infarction; 49 subjects returned for examination and reported having sustained a coronary attack; 15 subjects did not give a history of myocardial infarction at the time of reexamination, yet in each case there was undoubted electrocardiographic evidence of myocardial infarction. Of 58 subjects with clinically recognized infarctions, 53 had severe precordial discomfort and five had severe but atypical pain. None of the 15 subjects with unrecognized infarctions presented any typical discomfort; three had acute but not typical pain, four had slight discomfort not requiring medical attention, and eight had no discomfort at all. No significant differences could be found between the recognized and unrecognized groups in age, sex, occupation, weight or blood pressure.

The figures given above will not cover all the subjects in this series who had myocardial infarction without typical symptoms. It has been shown in other investigations that up to 50% of patients who have died suddenly in hospital had unrecognized, pathologically proved myocardial infarcts. Further electrocardiographic residua of myocardial infarction are not always easy to recognize or have disappeared altogether. Angina pectoris has been significantly less frequent following unrecognized infarction than following recognized infarction. There have been differences in the electrocardiographic position of the myocardial infarction in the two groups, but these may not be statistically significant. The present study emphasizes the importance of laboratory studies in the differential diagnosis of precordial discomfort and the relative frequency of practically symptomless myocardial infarction.

[1] *Ann. intern. Med.*, 1959, 50: 1359 (June).

DISEASE AND DESTINY.

THE latest series of Logan Clendening Lectures were delivered at the University of Kansas by Dr. Ralph H. Major, who for many years was Professor of Medicine and later Professor of the History of Medicine at this university. He is best known to us as the author of "Classic Descriptions of Disease", and for his comprehensive work "The History of Medicine", recently published in two volumes. He chose two widely different themes for an occasion set aside to honour the memory of Dr. Logan Clendening, whose learning and exceptional literary ability helped to encourage a revival of general interest in medical history nearly 30 years ago. These have now been published.[1]

The first essay, entitled "Disease and Destiny", is a philosophical study of the modern concept that over the centuries disease has played a significant part in changing the course of history, and Major quotes a number of instances in which its role seems to have been decisive. Beginning with the account given by the Greek historian, Thucydides, of the great plague of Athens in 430 B.C., Major tells how the Peloponnesian War ended in a victory for the Spartans after the epidemic had spread rapidly through the crowded city of Athens. Its ravages put an end to all active opposition by the enemy and led to the downfall of the mighty Athenian Empire. He goes on to discuss the decline and fall of the Roman Empire and the considerable importance of disease in hastening its doom. He then comments on the devastating consequences of the Black Death during the later Middle Ages, which wiped out nearly one-quarter of the world's population, while the power of its onslaught struck a fatal blow at the old feudal system in Europe, and paved the way for the religious reforms of a later century. The essay concludes with the appalling disaster which overtook the great army of Napoleon in its retreat from Moscow, and the potential danger to the world of arterial degenerations affecting the outlook of certain prominent individuals—"the great tragedies of life are arterial".

The second essay is a more cheerful study of the interesting and delightful personality of Logan Clendening, and of his successful efforts to encourage sound research in medical history and to popularize the subject among young doctors and intelligent laymen. Many of us had our first interest in medical history aroused after reading Clendening's fascinating book "Behind the Doctor" published in 1933, but may ever since have remained in complete ignorance of the handsome appearance, fine character and cultural background of the brilliant man behind the scenes. As well as supplying several excellent photographs of his subject, Dr. Major gives us a vivid impression of this colourful and scholarly physician, who was gifted with the happy faculty of being able to convey information and instruction to most people in an exceedingly palatable form. For this we may be grateful to Dr. Major, as well for the fact that, although his book is small, its contents have a distinguished quality which will be enjoyed by all doctors with a liking for the history of medicine.

[1] "Disease and Destiny: Logan Clendening", by Ralph H. Major; 1958. Lawrence: University of Kansas Press, 8¼" × 5½", pp. 50, with 7 illustrations. Price: $2.00.

Abstracts from Medical Literature.

PATHOLOGY.

Carcinoma Cells in Bone Marrow.

M. O. SKELTON (*J. clin. Path.*, January, 1959) has attempted to assess the probability of particular tumours metastasizing to those sites from which bone marrow biopsies are commonly taken. In a series of 225 cases of fatal malignant disease, excluding primary tumours of blood-forming organs, the sternum was examined at necropsy for the presence of malignant cells. In 127 cases of the series this was supplemented by examination of the iliac crest marrow. Metastases were found in one or other or both sites in 20% of the cases. In only two cases were metastases found in the iliac crest but not in the sternum. Sixty-nine cases of carcinoma of the lung were included in the series, and in 34% sternal marrow metastases were demonstrated. With oat-cell carcinoma of the lung 54% were found to have metastasized to the sternum. Indirect evidence is adduced suggesting that extensive sternal metastases may be present in cases of carcinoma of the lung after a relatively short clinical illness. It is suggested that sternal marrow biopsy may have a place as a diagnostic and as a screening procedure in this condition. The tendency of carcinoma of the stomach to metastasize to the skeleton is further confirmed.

Oxalosis and Primary Hyperoxaluria.

E. F. SCOWEN, A. G. STANSFELD AND R. W. E. WATTS (*J. Path. Bact.*, January, 1959) have described the anatomical and histological findings in a case of primary hyperoxaluria and oxalosis. The kidneys showed extensive calcium-oxalate nephrocalcinosis and lesions attributable to pyelonephritis and hypertension. The presence of calcium oxalate crystals in the tunica media of the small arteries and in the walls of the arterioles in many organs was a striking feature. Considerable amounts of calcium oxalate were demonstrated histologically in the myocardium and rete testis. The oxalate content of the cerebro-spinal fluid and of the pleural effusion was raised, whereas cerebro-spinal fluid from subjects who had died of unrelated conditions, including uræmia due to malignant hypertension, did not contain measurable amounts of oxalate. Large amounts of oxalate and calcium were demonstrated chemically in the kidneys and myocardium; the amounts in liver and skeletal muscle were not greater than in four unrelated diseases. The findings are discussed in the light of the few previously reported cases which have presented a similar histological picture, and points concerning the biochemistry of oxalate and some related two-carbon compounds are mentioned.

Papillary Tumours of Thyroid Gland.

D. B. BREWER (*J. Path. Bact.*, January, 1959) has described a series of 23 cases of papillary tumours of the thyroid gland. Nineteen of the patients were women; their ages ranged widely; eight were below 40 and four were above 70 years of age. The commonest presenting symptom was swelling of the neck. The longest history was 23 years. In 10 instances the history was five years or longer. Ten of the patients died, but only in four cases was death due to the tumour. Infiltration of the capsule of the thyroid gland was present in eight cases, but this histological feature appeared to have little prognostic significance. There were deposits in lymph glands in nine cases, and in four of these the enlarged glands were the presenting symptom. It is concluded that it is not possible on histological grounds to classify these tumours into benign and malignant groups. It should be accepted that papillary tumours of the thyroid are slowly growing, that they have a tendency to local infiltration and to spread to the regional lymph glands, but that there is little tendency to metastasize to structures outside the neck. Death attributable to such a tumour usually results from infiltration of the trachea. It does not seem possible to give any more precise prognosis in an individual case.

Antithyroid Antibodies.

R. B. GOUDIE, J. R. ANDERSON AND K. G. GRAY (*J. Path. Bact.*, April, 1959) have found complement-fixing antibodies in the serum of 6·8% of 486 hospital patients with no clinical evidence of thyroid disease. These antibodies are found over five times more frequently in females over the age of 50 years than in other individuals. There is also a significantly high incidence of antithyroid antibody in elderly females with liver disease. In this series the presence of antithyroid antibody in the serum during life was associated with histological changes in the thyroid gland obtained at necropsy. The most constant of these changes were lymphocytic infiltration and Askanazy-cell change of the thyroid epithelium, as in lymphadenoid goitre. In a series of 300 necropsies the high incidence of these pathological changes in the thyroid of elderly females has been demonstrated. The underlying cause of these findings is not known. Since the antithyroid antibody is usually specific for a component of the abnormal thyroid of thyrotoxic patients, it is postulated that in elderly females some symptomless abnormality of the thyroid precedes the formation of antibody. The possibility that the antibody may then produce the changes actually observed in the thyroid is discussed.

Cutaneous Angiitis.

M. RUITER AND H. N. HADDERS (*J. Path. Bact.*, January, 1959) have distinguished two groups of necrotizing angiitis amongst those entirely or chiefly limited to skin. In group A the main emphasis is on the small superficial blood vessels in the dermis, while in group B the medium sized arteries of the muscular type at the junction of the cutis and subcutis or even in the hypodermis are involved. The vascular changes in group A correspond to a group of cutaneous eruptions included in the term arteriolitis (vasculitis) allergica cutis. Arterioles, venules and capillaries are particularly affected. As a rule, the vascular alterations bear an exudative character, and all appear to be about the same age. The most marked vascular changes are swelling of the endothelial cells, fibrinoid changes of the vessel wall and inflammatory infiltrates, mainly consisting of leucocytes with pronounced nuclear disintegration. Eosinophils are present in most cases. Distinctly proliferative reactions on the part of the vessel wall are seen only rarely. Group B comprises the cutaneous type of periarteritis nodosa. The most striking vessel wall changes are fibrinoid swelling of the intima and fibrinoid necrosis, notably at the border of the media and adventitia. These are accompanied by dense inflammatory infiltrates, chiefly consisting of polymorphonuclear leucocytes, often showing pronounced nuclear disintegration. Eosinophil leucocytes are sparse. A single section may show not only exudative stages but simultaneous reparative processes in which the media and the adventitia show a granulomatous inflammatory reaction. In arterial branches of smaller size fibrinoid swelling of the intima is often observed as the initial change. The vascular changes observed are identical with those described in periarteritis nodosa affecting internal organs. In the cutaneous type, however, the vascular lesions are almost exclusively confined to the skin.

Biopsy of Rectal Polypi.

C. A. HELLWIG AND E. BARBOSA (*Cancer*, May-June, 1959) have attempted to assess the reliability of biopsies of rectal polypi. The authors have followed 20 cases of non-invasive carcinoma after simple excision of the polypus; none developed invasive carcinoma. These, together with the 150 patients with non-invasive carcinoma reported in the literature to have been cured by simple excision of the polypus, have led the authors to conclude that polypi should not be labelled carcinoma unless there is invasion of the connective tissue pedicle. Except in cases where there is a high degree of malignancy, biopsies are unreliable. Furthermore, malignant foci in the centre of a polypus may be masked by benign peripheral portions. Biopsies of rectal polyps can only be reliable when the specimen includes the pedicle.

Experimental Glomerulonephritis.

R. T. MCCLUSKEY AND B. BENACERRAF (*Amer. J. Path.*, March-April, 1959) have found that the injection into mice of soluble antigen-antibody complexes derived from other animals, induced manifestations of serum sickness. Severe acute glomerulonephritis, necrotizing arteritis, and acute endocarditis were observed within 36 hours of the first injection. Evidence is presented to show that the lesions are brought about by the localization of preformed antigen-antibody complexes at sites where tissue damage occurred.

Experimental Congenital Malformations Induced by Salicylates.

J. WARKANY AND E. TAKACS (*Amer. J. Path.*, March-April, 1959) induced congenital malformations in rats by salicylate poisoning of the mothers while the

embryos were in an early stage of development. Among the anomalies produced was craniorhachischisis with well preserved cerebral and spinal tissues. This condition seemed comparable to the early stages of a similar condition in human fœtuses. Other malformations were exencephaly, hydrocephaly, facial clefts, eye defect, gastroschisis and irregularities of vertebræ and ribs.

Macroglobulinæmia.

T. F. DUTCHER AND J. L. FAHEY (*J. nat. Cancer Inst.*, May, 1959) have described the clinico-pathological features of three cases of proved macroglobulinæmia. Two of these were of the Waldenström type and one was of the Bing-Neel syndrome. The histological findings were those of a pleomorphic reticulo-endothelial proliferation giving rise to varying proportions of plasma cells which contained intranuclear periodic acid-Schiff material. In the third case the reticulo-endothelial proliferation had given rise to two tumour-like masses in the brain. The authors suggest that the intranuclear material may be the same as the circulating 18S hexose-rich gamma macroglobulin. The classification of macroglobulinæmia is complicated by the variety of clinical aspects, by the variety of the histological findings and by the differing physico-chemical properties of the macroglobulins. The authors discuss these features and differentiate between this disease, lymphoma and multiple myeloma.

THERAPEUTICS.

Cytostatic Action of Certain Auxins.

C.-A. APFFEL (*Presse méd.*, January 31, 1959) presents a preliminary report on the cytostatic action of certain auxins. He states that in low concentrations auxins hasten the catabolism of carbohydrates, activate oxidative phosphorylations, increase the oxygen consumption of tissues, and stimulate growth. In high concentrations they produce carbohydrate depletion, prevent anaerobic glucolysis, lower the potassium level in the tissues, and inhibit growth. Auxins have the property of regulating the levels of nucleic acids and of antagonists of the factors of cellular division such as kinetin or 6-furfurylaminopurine. Their inhibiting action on growth is highly selective. In plants it is always stronger when the tissue on which the auxin is acting is young and less differentiated. The use of synthetic auxins as herbicides is based on these properties. Auxins also act, although to a lesser degree, on animal metabolism. The author investigated the use of certain auxins for the selective inhibition of benign and malignant human and animal tumours. Auxins in ionizable form were found to be inactive. On the other hand, non-dissociable derivatives (alcohol esters) were found to have considerable cytostatic action. The tumour-inhibiting action of these auxins is reinforced by riboflavine. If auxin treatment is given simultaneously with radiotherapy, or if radiotherapy is given less than three weeks before, the auxin treatment considerably reinforces the cytostatic action of the radiotherapy, even when the irradiation dosage is below the therapeutic threshold. The auxin esters mentioned have very low toxicity, and never depress hæmatopoiesis. Their hypoglycæmic effect has been proved. They are preferably administered in an oily solution by intramuscular injection in a dosage of 0·5 to 1·0 gramme per day.

A New Hæmatinic Agent.

D. C. AUSMAN (*J. Amer. Geriat. Soc.*, March, 1959) states that even recently developed iron preparations produce undesirable side effects in about 20% of patients, and that there is therefore still a need for an iron preparation which is well absorbed, well tolerated and highly effective in all instances. He presents a preliminary report on the absorption of iron after oral administration of a new capsule preparation containing ferrous gluconate and polyol monolaurate ("Simron"). An investigation by other workers to test the safety of polyol monolaurate administered over long periods had demonstrated incidentally that the compound had an enhancing effect on the absorption of iron. In the author's investigation, observations were conducted on 26 patients with iron deficiency anæmia who were given daily doses varying from one to eight capsules. As a result of these observations he suggests a dosage of one capsule three times a day, containing the equivalent of 30 mg. of elemental iron per day. The absorption and utilization of iron, calculated from increased circulating hæmoglobin after therapy, averaged 29%. It was therefore seldom necessary to give more than 30 mg. of iron daily, and this dose produced transient side-effects in only one of the 26 patients studied. Absorption and utilization of iron with this preparation were better than with ferrous sulphate in those patients who had received previous courses of iron therapy.

The Effect of Bland Fluids and Anticholinergic Drugs on the pH of Gastric Contents.

T. J. THOMSON (*Clin. Sci.*, November, 1958) describes an investigation into the effect of bland fluids and anticholinergic drugs on the pH of gastric contents in cases of duodenal ulceration. He states that the traditional use of a bland diet in the treatment of peptic ulcer is based on clinical experience, but that the evidence for any beneficial effect resulting from prolonged dietary restrictions is less certain. Anticholinergic drugs are prescribed on the assumption that the gastric hypersecretion of duodenal ulcer is caused chiefly by parasympathetic activity, but the action of anticholinergic compounds upon gastric secretion is not known precisely. Twelve men and three women were studied, each of whom was known to have an active uncomplicated duodenal ulcer with a typical history. It was found that neither continuous intragastric milk drip nor two-hourly feeding with bland fluids supplemented with anticholinergic drugs raised the pH of the gastric contents to values above 4·0. The authors conclude that, although the period of treatment was only 13 hours, it was unlikely that even prolonged administration of similar dietary or drug therapy would significantly alter acid-pepsin activity in patients with duodenal ulcer. Any benefit which may result must be due to factors other than the raising of the pH of gastric secretion.

Chlorothiazide in Hypertension.

E. D. FREIS (*J. Amer. med. Ass.*, January 10, 1959) discusses the treatment of hypertension with chlorothiazide. In normal subjects chlorothiazide does not reduce blood pressure, but in hypertensive patients it induces a loss of up to 1·5 grammes of salt in the urine in the first 24 to 48 hours. At the same time the blood pressure falls. This occurs in non-œdematous hypertensive patients. Chlorothiazide increases the effect of any hypertensive drug and permits lower doses to be used of the ganglion-blocking drugs or of "Apresoline". Rauwolfia preparations are also aided by chlorothiazide. The author suggests a dosage of 500 mg. of chlorothiazide twice daily and states that this dose has been given continuously for a year without toxic effects in uncomplicated hypertension. "Apresoline", 25 to 50 mg. twice or thrice daily, is suggested as the best drug to combine with chlorothiazide. The author emphasizes the fact that when chlorothiazide is added to ganglion-blocking agents the dose of the latter must be reduced by half, otherwise there would be too great a fall of blood pressure. Toxic effects from chlorothiazide are stated to be rare under the foregoing regime, though hypopotassæmia occurs frequently but without toxic effects in uncomplicated hypertension. In cardiac patients toxic effects are common, especially if digitalis is also being prescribed. It may then be necessary to give chlorothiazide intermittently, though the blood pressure rises when the drug is discontinued. In cases of renal disease associated with hypertension the danger is greater, as uræmia may develop when the blood pressure falls. The author emphasizes that it is in uncomplicated hypertension that chlorothiazide is least likely to do harm.

CAA 40, a New Vasodilator.

M. MOUQUIN *et alii* (*Presse méd.*, April 11, 1959) have carried out a clinical and experimental investigation of a new vasodilator, *p*-hydroxyphenyl-methyl-phenoxyethylamino-propanol (CAA 40, "Duvadilan"). The clinical material consisted of 17 patients with coronary artery disease and 24 with diseased arteries in the lower limbs. In the first of the two groups the results were classed as good in 29%, moderately good in 53% and bad in 18%. In the second group the results were good in 50%, moderately good in 21% and bad in 21%; 8% of the patients were not counted, as treatment had to be discontinued. The percentage of satisfactory results compares with those obtained by other workers. The authors state that, even if treatment with CAA 40 cannot check the progress of arterial disease that has reached the stage of extensive thrombosis and gangrene, it appears to be a therapeutic agent experimentally and clinically superior to the drugs at present in use. They believe that CAA 40 should have a prominent place amongst modern vasodilators.

Special Article.

BURYING LIVE ATOMS.[1]

IN the drowned landscape beneath the oceans there are great valleys, in comparison with which the Grand Canyon of Colorado, a mile deep, 200 miles long, is not so very grand. Nineteen ocean "trenches" are over four and a half miles deep, and some are thousands of miles long. In the search for "burial grounds" for the disposal of radioactive wastes, which may become a problem when the atomic industry develops on a world-wide scale, those "trenches" seemed likely places. It was assumed that they were troughs of stagnant water. There, so the argument went, the dangerous elements, in their concrete metal coffins, would lie undisturbed for centuries until their radioactivity was spent.

This glib assumption was questioned three years ago at the first International Conference on the Peaceful Uses of Atomic Energy. At the second meeting in Geneva the illusion was finally dispelled.

In the intervening years the Russian ship *Vityaz* carried out oceanographic investigations of 12 of these trenches. The findings of the expedition have shown that the trenches are unsuitable places for the disposal of radioactive waste.

Biological Elevator.

At the conference, Dr. E. M. Kreps (U.S.S.R.) reported in detail on the Tonga Trench, which extends southwards for nearly 700 miles from the Samoa Islands to the Kermadec Islands. The Russian expedition found that, by comparison with the findings of the *Galatea* expedition in 1952, the deep water temperature had risen. This showed that even at the greatest depth a change of water takes place in as brief a space as five years. The distribution of oxygen and phosphates and the presence of living organisms consuming oxygen at every depth showed that the water was actively mixing, horizontally and vertically. This means that the dangerous materials with long-lived radioactivity will be liable to break loose and escape upwards into the upper layers of water. There marine life would become radioactively infected and form a biological chain reaction which would end up in the food of human beings.

The warning was reinforced, at the conference by Dr. B. H. Ketchum, of the Woods Hole Oceanographic Institution. He showed that there was a kind of biological elevator in the sea which would bring radioactive materials from the deeps to the surface. Sea organisms, he showed, concentrated the fission products so that the plankton in the Bikini test area of the Pacific had 470 times more radioactivity than the water itself.

In life, the marine organisms would pick up, concentrate and transfer the radioactivity from the contaminated layers of the ocean to the uncontaminated. In death, the organisms would sink towards the bottom, and the fission products, bound up in their skeletons, would increase the radioactivity in the depths. Thus there would be an upward and downward movement of radioactivity, apart from any mixing of the upper and lower waters. This drastically changes the picture which assumed that the transfer between the deeps and the surface would take about 300 years.

No Cause for Alarm.

Both Britain and America have been dumping radioactive materials in the Atlantic trenches, but of a kind and on a scale which so far gives no cause for concern. The British explained that the only materials they had so far deposited were contaminated machinery from Harwell, of a shape which made it awkward for them to be stored in the safety tanks in which long-lived fission products are kept. The total amount of radioactivity deposited in eight years in the deeps, by the British, amounted to about 600 curies, an insignificant amount in dilution. The Americans have carried out regular surveys of their "ocean graveyards" and have found no evidence of any increase in the radioactivity of the water.

The disposal of radioactive liquid wastes in coastal waters is another matter. The British have had a long experience of disposing of this kind of "sewage" from their atom factory at Windscale in Cumberland. A pipeline carried the effluent two miles beyond high water mark into the Irish Sea. This is very mild radioactivity, since the main fission product wastes are concentrated and stored inland. The discharging into the sea is carried out under strict supervision of government inspectors and under public health regulations already established. To inspection at the source is added strict and continual hydrographic and biological surveys of the sea and the shoreline. As part of this programme over 35,000 fish were caught and marked, and some were recaught under a planned fishing programme. These, like the edible seaweed and the sands of the shore, have given little indication whatever of any increase in radioactivity which might cause concern.

The Russians at the conference took a very strong line that no radioactivity of any kind should be disposed of in open waters, or on land, under any conditions in which it might seep into the ground water. They reported that even their mild effluent is run into concrete ditches and sealed off by concrete.

Tank Storage Safest.

What was made abundantly and consistently clear was that the disposal of waste so far has not been on a scale, or in circumstances, such as to constitute a present public health hazard. The insistence of the many technical papers presented on this subject was on the precautions necessary for the future. What was emphasized was that a great deal more research must be done before any kind of "dumping" could be tolerated. The only safe method of storage is in tanks in which the radioactive substances are allowed to decay—and some of them will take centuries to do so. To the complications of storage is added the fact that in giving off their radiation the elements are producing heat, which, in given circumstances, will cause the tanks to boil—and go on boiling for 100 years.

And, of course, there is always the risk, even in peaceful uses, of an accident. Again, experience so far has been reassuring. The atomic energy industry, already employing hundreds of thousands of people, is, on its record, the safest of all industries. Its accident rate, even in terms of non-radioactive accidents, is the lowest of any industry, because the preoccupation with the new kind of hazards has increased the precautions against the old kind of hazards.

The most serious accident so far has been the "burn-out" of the British reactor at the Windscale plutonium factory. There were no casualties, and no one suffered ill-effects.

Public Health Lesson.

But it demonstrated a public health risk. The reactors at Windscale, which have been operating since 1950, are air-cooled. Cooling air is drawn through filters from the atmosphere and then blown through the reactor core. The exhaust air is passed through a bank of filters mounted at the top of a stack 410 feet high. On the occasion of the accident these filters trapped the larger particles from the damaged reactor, but finer particles and gases escaped. At the Geneva conference a detailed account of this was given, which will become a text-book lesson for public health authorities everywhere. It included an exact record of meteorological conditions and of the "flying squads" of radiation experts who toured the area examining the herbage, the soil and, eventually, the milk. Examination of the milk revealed the presence of radioactive iodine, and the milk from farms over an area of 200 square miles was banned from use. Vegetables, eggs, meat and drinking water were also monitored, but no contamination was found which would constitute a hazard. Adults and children were examined to discover if any radio-iodine had been ingested and had found its way to the thyroid gland. No results were found to cause dismay.

The survey was extended to Southern Scotland, Yorkshire, Lancashire, Westmoreland and North Wales, and later samples of milk were collected from the Isle of Man, Northern Ireland and the South of Scotland. The outcome of these immediate and also long-term studies showed no significant deposition of radioactivity other than radioactive iodine. For the physicists and engineers the accident emphasized the precautionary measures needed in design and in control of reactors. For the public health authorities it was an alarming but salutary experience which will be turned to account in legislation and in practice as atomic power stations develop not only in Britain but throughout the world.

International Control.

It underlined the appeal made by the Netherlands Royal Academy of Sciences to the conference for international

[1] The author of this article, Ritchie Calder, is a well-known British science writer and a member of the Council of the British Association for the Advancement of Science. This is the first of three articles he has written for WHO on health aspects of atomic energy as discussed at the recent Geneva conference. It has been made available for publication by the Western Pacific Regional Office of WHO.

measures to control the radiation risks. As Professor J. H. de Boer, the spokesman for the Academy, emphasized at the final session of the conference, radioactivity knows no frontiers. The hazards are particularly serious in Western Europe, with its dense population and great industrial activity presently to be increased by atomic power reactors. He pointed out that the siting of reactors might be a hazard to neighbouring countries, and that there must be international agreement about their location. He cited the "stationary sources of danger"—all types of reactors, fuel reprocessing plants, stores of radioactive waste and industries increasingly using radioisotopes. But he also cited mobile sources—atom-driven ships and possibly, later, aircraft; and the transport of radioactive materials by sea, air and land. The radioactive material might cross territorial frontiers in the atmosphere, in the waters of the oceans, rivers, lakes, canals, etc., and by actual transport. While insisting that the problem for Western Europe is more urgent than for any other part of the world, Professor de Boer, on behalf of the Royal Netherlands Academy, appealed for international regulation of radioactive hazards.

As a measure of the problem, consider that the United States in 14 years has accumulated 60,000,000 gallons of radioactive elements stored in more than a hundred indestructible steel tanks. The cost so far has been $65,000,000. Some of the elements will remain dangerous for decades, others for centuries, and plutonium for at least 24,000 years.

Forty-two years from now—on the estimates of the world's use of peaceful atomic power for 2000 A.D.—the amount of waste will require 100,000 acres a year as "burial ground"—that is, if they use the most compact methods of disposal, like fusing the fission products in glass.

As the chairman of one of the sessions commented, "the tombs of radioactive waste are becoming as elaborate and expensive as those for the mummies of the Pharaohs".

RITCHIE CALDER, C.B.E.,
W.H.O. Information Consultant at the United Nations Second International Conference on the Peaceful Uses of Atomic Energy.

Clinico-Pathological Conferences.

A CONFERENCE AT SYDNEY HOSPITAL.

A CLINICO-PATHOLOGICAL conference was held at Sydney Hospital on July 15, 1958. DR. J. E. REIMER, Honorary Assistant Surgeon, was in the chair. The principal speaker was DR. W. L. CALOV, Honorary Consulting Physician.

Clinical History.

The patient, an Indonesian sailor, aged 35 years, spoke no English and presented a letter from the ship's surgeon stating that 10 days previously he had complained of pain in the right hypochondrium, and that an enlarged liver (four fingers' breadth below the costal margin) was found: the pulse rate was elevated and the temperature normal; on the day of the patient's admission to hospital the abdominal pain had become much more severe and was accompanied by shock, and the blood pressure could not be measured. He was given morphine. Through an interpreter it was learned that the patient had been well up to one month previously, though his appetite had always been poor. He then began to suffer from diarrhœa, passing four motions daily. These contained blood and slime. He had vomited a few times, and on the day of his admission had coughed up a little blood. He denied weight loss and previous illness.

Examination of the patient showed he was suffering pain, and at that time was not jaundiced. The pulse was thready and regular at a rate of 110 per minute. The blood pressure was 95/75 mm. of mercury. There was no other abnormality of the cardio-vascular system. The liver was enlarged, extending four fingers' breath below the costal margin, and tender. The liver dullness also extended to the fourth right intercostal space. Several observers remarked on the increased resistance of the abdominal muscles. The bowel sounds were absent. On rectal examination, there was generalized tenderness and no localized area of tenderness. The rectal mucosa was normal. There was an area of diminished intensity of the breath sounds at the base of the right lung. Otherwise the respiratory system was normal. The spleen and lymph nodes were not palpable. The other systems were normal. The urine was normal on ward tests. X-ray films showed no gas under the diaphragm and considerable elevation of the right dome of the diaphragm, with associated collapse of the right base. The hæmoglobin value was 9·0 grammes per 100 millilitres, the anæmia being normocytic with marked polychromasia. The leucocytes numbered 17,200 per cubic millimetre, 82% being neutrophils which showed a shift to the left; 10% were lymphocytes, 6% monocytes and 2% eosinophils.

A consultant surgeon now considered that there was some degree of peritonitis and that amœbic abscess was the probable cause. The intramuscular injection of emetine, in a dosage of 0·5 grain twice a day for 10 days, was commenced. Examination of fresh specimens of fæces showed they contained mucus, the larvæ of *Strongyloides stercoralis* and the ova of *Trichiuris trichiura*. No vegetative or encysted amœbæ were found. Sigmoidoscopic examination showed normal mucosa to a height of 15 cm. Repeated fæcal examinations failed to show amœbæ. With intravenous infusion of saline and glucose the blood pressure rose to 110/80 mm. of mercury, the bowel sounds returned and the abdomen became soft. There was still persistent blood-stained sputum. The response to the Casoni test was negative, and the Wassermann and Kahn tests produced positive reactions. The blood urea nitrogen content was 28 mg. per 100 ml., and the creatinine content 2·1 mg. per 100 ml. The serum bilirubin content was 7·6 mg. per 100 ml., and there was now icterus of the scleræ. The thymol turbidity was less than two units, and the serum alkaline phosphatase content was 16·3 King-Armstrong units.

A registrar's opinion now was that the symptoms were due to Strongyloides infestation, since the patient appeared to be suffering continuous abdominal pain. A remittent rise in temperature to 100° F. was present for the first four days. Now, however, severe abdominal pain returned and a "crisis" was thought to be the cause. A surgical consultant now agreed to explore the liver; he passed a trochar and cannula through the ninth right intercostal space and recovered a large amount of heavily blood-stained material. An incision was made, and yellow material and blood were removed. No amœbæ were found in this material. A tube was inserted into the cavity in the liver.

After operation the patient became worse, with falling blood pressure and rapid pulse. He died three days later in spite of efforts at resuscitation including blood transfusion. Two days before his death it was thought that the heart sounds were abnormal, though it was not certain whether the abnormality was a friction rub or a third heart sound.

Clinical Discussion.

DR. J. E. REIMER: I am sure you all share with me the pleasure of seeing Dr. Calov as the principal speaker today. Dr. Calov has always been a strong supporter of these conferences, and I recall about 10 years ago his acting as chairman for a conference in which I, as an undergraduate, was the speaker. It gives me great pleasure as chairman to call on Dr. Calov to discuss this patient and we all look forward to his presentation.

DR. W. L. CALOV: We are told this man was an Indonesian sailor aged 35 years, and this age is well within the cancer age group, and is also one in which infections are prominent as causes of disease. As he was an Indonesian, he came from a country in which hygiene is not advanced, tropical diseases are rife, infestations by helminths almost universal and infection by protozoa common. He was a sailor and spoke no English. It seems likely, therefore, that he had not long been in contact with English-speaking Europeans, and possibly this means that he may not have had confidence in European medicine. The probability is that he would not have disclosed his illness early, and it is very likely that he was suffering from his symptoms long before the 10 days mentioned by the ship's doctor in his letter. In addition, the history was obtained through an interpreter, and this is open to the speculation that it may not have been very accurate.

It seems certain that the patient had pain in the right hypochondrium. He was said to have had bloody diarrhœa a month previously, passing four motions a day. In this case the diarrhœa was not due to bacterial dysentery, for in acute bacterial dysentery there are numerous fluid motions, not just four daily, stained with blood. It is difficult to be certain, but the possibility is that these stools were formed or partly formed, and that they also contained pus and blood. The first thing to consider

in such a case in an Indonesian is amœbic dysentery. In amœbic dysentery it is not usual to see numerous fluid stools. In addition, I think it is fairly certain that there had been previous attacks of this diarrhœa, though the language difficulty may have made it difficult to elicit this.

I think that we have to accept the swelling in the right hypochondrium as an enlarged liver. We have this verified by several observers, and not only was there enlargement downwards, but the upper border of the liver dullness was above its normal level.

So we have loose stools and enlargement of the liver, and then something happens. He is brought into hospital in a collapsed state and a very sick man. At this stage, if one were to assume that he had amœbic dysentery and amœbic abscess of the liver, we could suppose that the liver abscess ruptured into the lung (and there is some support for this suggestion in the hæmoptysis), or into the abdomen, or perhaps there was a rupture of a hollow viscus. The latter possibility is unlikely, because there was no gas under the diaphragm. The greater possibility is that there was a rupture of the amœbic abscess, and the possibility of rupture into the lung cannot be lightly set aside.

Of course, there are many other causes of hepatic enlargement which I do not intend to mention, let alone discuss. However, in this case there are several possibilities which merit serious consideration; but I will deal with these later.

The bowel sounds were absent, and I think that the bowels were inactive—there was stasis in he intestinal tract. However, there was no intestinal obstruction in the ordinary sense. The patient had griping pain, no symptoms of intussusception, volvulus or newgrowth.

We find that the spleen was not enlarged, and this is important in our consideration of hepatic enlargement. There is no description of the appearance of the stools either macroscopically or microscopically. I would have liked to know if the stools were foul, whether or not they were partly formed, and what the microscopic appearances were, apart from the bald statement that no *Entamœba histolytica* was found. A large bacterial content and the presence of Charcot-Leyden crystals would have been important information, for in bacterial dysentery the bacterial content is low, but in amœbic dysentery it is high and Charcot-Leyden crystals are often present.

Strongyloides stercoralis is a minute helminth that lives in the small intestine, and there is a certain amount of discussion as to whether or not it causes diarrhœa. No doubt it could cause diarrhœa if present in sufficient numbers; but it would be most unlikely to produce symptoms anything like those present in this patient. *Trichiuris trichiura* is a small worm that also lives in the small intestine, and it probably causes no symptoms and is of no consequence. The Casoni test was negative and the Wassermann and Kahn tests were positive. The patient was a sailor, and the possibility is that he had syphilis and the hepatic enlargement might have been due to syphilitic disease of the liver. On the other hand, the Wassermann reaction can be positive in certain protozoal diseases—for example, in malaria. I have never encountered a positive Wassermann reaction attributable to amœbiasis, and I do not know if this is possible. Furthermore, the patient came from an area in which frambœsia is endemic, and this may have been the cause of his positive serum Wassermann reaction.

If we maintain that the patient had amœbic dysentery, we have to explain certain features of the examination of the lower colon. We wonder why rectal and sigmoidoscopic examination did not reveal anything helpful. When he was examined per rectum, there was generalized tenderness, but no localized tenderness. I do not think this is significant, because I think many people have tenderness unless the greatest gentleness is used during examination. The finding of normal rectal mucosa only rules out ulcerative colitis and bacterial dysentery, but it does not rule out amœbic dysentery, because the amœbic infection can be concentrated very largely in the caecum and ascending colon and may not be discernible in the descending colon and rectum. Furthermore, when abscess formation in the mucosa is recent, there may be only a pinpoint opening which can easily be missed, the intervening mucosa appearing normal. It is not surprising if no abnormality on sigmoidoscopic examination is found in a patient suffering from amœbic dysentery.

We find that the patient had no fever when first admitted. I think that this was probably an isolated reading, and I do not doubt that at some little time later there was pyrexia, and this is confirmed in the protocol, which states that fever was present for the first four days.

Eventually we discover that there was a neutrophil leucocytosis, and this is consistent with the presence of pus. There was a not very severe grade of anæmia; but the anæmia is significant. When first admitted, he was found not to be jaundiced. This is difficult to believe, because several days later there was a serum bilirubin of 7·6 mg. per 100 ml., and I feel that jaundice must have been present on admission, and I attribute this clinical error perhaps to indifferent light at the time of examination.

When the surgeon decided to aspirate, he recovered blood-stained pus. He also drained out a quantity of pus and blood from the tube. When this was examined, no amœbæ were found. This does not rule out amœbiasis, because *E. histolytica* is not found free in pus in the early stages. The organism is found only by scraping the wall where it lives. Only degenerate material is found in the pus. Moreover, we must remember that the patient had been given emetine, to which the amœba is very sensitive, and this may have militated against finding the organism. Needless to say, cysts are found in the pus and are not found in the acute phase in the stool.

So we have the information that neither cysts nor vegetative forms have been demonstrated in this patient.

In regard to the X-rays, some comment should be made on the finding of lower lobe collapse. I do not think it is necessarily lower lobe collapse, but rather a collapse of the lower part of the lung. The diaphragm, of course, is markedly elevated, but this does not mean there is necessarily pus below the diaphragm. A similar picture is sometimes seen in the left lower lobe in rupture of the spleen. The mechanism of this collapse is not clear.

Having made out some sort of case for amœbiasis, I think it is only fair to point out that since amœbæ were not demonstrated at any time in this patient, we should seriously consider other possibilities.

Occasionally empyema of the gall-bladder results in a gigantic organ filled with pus; but one could hardly expect it to cause such elevated diaphragm, nor could it be related to the bloody diarrhœa or hæmoptysis. Suppurative cholangitis may result in an abscess of the liver; but this possibility has the same objections as the previous one. Pyogenic abscess of the liver from another cause such as pyæmia or portal pyæmia (for example, from appendicitis) or some other suppuration in the abdomen can also be ruled out, on clinical grounds.

We should consider infestation with bilharzia. The patient may have been in an endemic area. *Schistosoma mansoni* and *S. japonicum* can cause enlargement of the liver; but usually there is cirrhosis with enlargement of the spleen. It could also cause blood-stained diarrhœa; but I do not imagine it could cause a large abscess of the liver. Subphrenic abscess is a very remote possibility, since there are no symptoms of its commonest causes—that is, acute appendicitis and ruptured ulcer and carcinoma of the colon.

In view of the positive Wassermann reaction, suppuration in a gumma should receive mention, though one can hardly explain the disturbances above the diaphragm on the basis of this lesion.

The most serious possibility to be considered, as I mentioned earlier, is carcinoma of the liver, and this cannot be excluded; but I do not think it is likely. It seems to me that in a man who comes from a country in which tropical diseases are rife, and where living conditions are unhygienic, who has bloody diarrhœa and an enormous liver with pus in it, and who is spitting blood, the diagnosis of amœbiasis must be the first considered, and is very likely.

At post-mortem examination I expect the morbid anatomist found ulceration of the caecum and ascending colon with amœbic ulcers, and a high abscess of the liver containing chocolate-coloured material. There was probably free chocolate-coloured fluid in the peritoneal cavity, which resulted from ruptured amœbic abscess of the liver.

A STUDENT: It appears that some slow leakage from the liver abscess into the peritoneal cavity would account for the patient's early shock and absence of bowel sounds, while a rupture through the diaphragm appears to be a good explanation for the hæmoptysis.

A STUDENT: I would like to ask Dr. Calov if he considers that some of the symptoms, especially the cough and blood-stained sputum, may have been due to infestation with *S. stercoralis*.

DR. CALOV: I do not think so. It is true that during the invasion of the body the worm passes through the

lungs. But this was an infestation established in the gastro-intestinal tract, and I think it extremely unlikely that the respiratory symptoms were due in any way to this helminth. On the other hand, they may have been responsible for the diarrhœa.

DR. A. P. FINDLAY: I have been greatly influenced by Dr. Calov's explanation of the symptoms as being due to amœbiasis, and in many respects the history is typical of a mild alimentary infestation followed by hepatic amœbic abscess. However, in my own study of the case history, I was struck with the presence of abdominal rigidity and absent bowel sounds found when the patient was first admitted. At this stage, the possibility of a perforated hollow viscus, with the complication of an hepatic abscess, could have been considered. The perforation could have been pinpoint in size and subsequently closed over. There is also the fact that amœbæ were never found, though, in view of Dr. Calov's remarks, that is not sufficient to weigh heavily against the diagnosis of amœbiasis. On the whole, I now feel more convinced that the patient had amœbiasis, though I feel that, at the time of admission, it may have been wise to open the peritoneal cavity as was intended.

DR. B. M. HURT: I am somewhat suspicious about this case. It seems to be altogether too clear that it is a case of amœbiasis. I am not quite clear about it, but I interpret the time relationship of the commencement of emetine as four days before death. However, if the emetine had been given for 10 days, I think amœbic abscess would be less likely to have produced these symptoms. I would like Dr. Calov to comment on this. The other thing I am suspicious about is the words "yellow material and blood". It appears to me that the author of the protocol was not prepared to say that it was pus that was aspirated. It might have been débris of some other sort, such as necrotic neoplasm. Though it appears to be a case of amœbic abscess with rupture into the peritoneal cavity, I, like Mr. Findlay, would have thought that the peritonitis deserved laparotomy, but the surgeon was unwilling. One thinks, of course, of neoplasm in an Indonesian, though necrotic material would be an uncommon finding.

PROFESSOR W. K. INGLIS: Mr. Chairman, I would like to ask if Dr. Marsh agrees with the interpretation of the X-rays.

DR. H. G. MARSH: My thought about these X-rays is that in view of the blood-stained sputum there does not appear to be much change in the lungs. Neither does the appearance accord with the view that an amœbic abscess ruptured into the lung. In my recent experience I can recall two cases in which there was rupture of an hepatic amœbic abscess into the lung, and in each case extensive changes were seen in the X-rays. In this case, the films undoubtedly show gross enlargement of the liver, upward displacement of the diaphragm and only compression of the lung base. I think, in view of the X-ray appearance and the clinical story, a primary new-growth of the liver deserves more consideration than it has been given.

DR. C. H. CAMPBELL (New Guinea): I noted that the patient was a sailor and that he came from a malarious area, and no mention of this has been made in the discussion. In tropical areas we tend to think of multiple ætiological factors rather than single ones, and it might well be that malaria is a contributing factor to this illness. In the absence of splenomegaly this is less likely. As regards the interpretation of positive serum Wassermann and Kahn reactions, we have in tropical areas both syphilis and frambœsia. We tend to regard a positive Wassermann reaction in town dwellers as more likely due to syphilis, and in patients from less developed areas more likely to indicate frambœsia. In this patient, who was advanced enough to become a sailor, the probability is that unless it is a "false positive" it indicates syphilitic infection. I think it an important feature that we do not have information regarding cultures of the fæces or the aspirated pus. It would be of interest to know what organisms were cultured from each. I feel that there is an abscess in the liver, and on the history we would have to treat it as an amœbic abscess; but I find it hard to believe that if this abscess ruptured into the peritoneal cavity, the patient would have recovered with only glucose-saline. Ruptured amœbic abscess would have terminated fatally at the time. The spitting of blood could be due to lung changes that occur with liver abscess. The diarrhœa itself may be related to the abscess of the liver.

There is another point. The patient had been given emetine, and appears not to have been affected by it. I do not think it is important that amœbæ were not found; but this response to emetine is puzzling, since the shock responded to glucose-saline. We are being encouraged to exclude amœbiasis as the diagnosis.

To account for the shock, we have to suppose that he had a liver abscess that may have ruptured perhaps into the subdiaphragmatic space. I do not know how, but there was almost certainly some bleeding into the peritoneal cavity, which was uncontaminated by amœbæ. This bleeding produced the symptoms at the time of admission.

I would say he had an abscess of the liver whose ætiology is undetermined. Amœbiasis in this patient is very doubtful.

DR. R. G. LEWIS: The coughing up of blood was mentioned only once in the history, I do not think it is given again. It is something given in the history and not observed, and it struck me, as it did Dr. Marsh, that there was not enough change in the X-ray to enable us to incriminate any lung or pleural spread at all. The raised diaphragm could be due solely to liver abscess. While Dr. Hurt says that the protocol is screaming amœbiasis at us, I think the protocol is trying to turn us away from amœbiasis, because it is the correct diagnosis.

PROFESSOR W. K. INGLIS: Might I ask if the material aspirated from the liver was examined microscopically, and was it actually pus or necrotic material?

DR. E. HIRST: It was examined microscopically, and as the protocol states, "no amœbæ were found in it". No further details of the examination were given, and I would prefer to make no further comment.

DR. M. J. INGLIS: I was struck mainly by the lack of response to emetine, which is surprising if there were amœbiasis. The yellow material recovered at aspiration is an unusual finding in amœbic abscess at the stage at which operation was performed. In addition, after aspiration and drainage the patient did not rally as expected. I wonder if this was due to some other disease, or whether there was also leakage into the peritoneal cavity after drainage.

DR. CALOV: In regard to the apparent lack of response to emetine, I do not consider we need suppose that there was a lack of response; for one effect may have been shown in the inability of the pathologist to demonstrate amœbæ in the material aspirated from it.

In addition, it is not to be expected that the patient would recover if a large amount of liver had been destroyed. I had experience of a similar case, in which an amœbic abscess of the liver had been undiagnosed for seven weeks and this patient also did not recover. He had had too much liver destroyed, as evidenced by our finding of a very large amœbic abscess at operation. I think the patient under discussion may have been in a similar plight. The sudden collapse before death was not unexpected if there was only a little liver tissue remaining. I did not mention the possibility of the lung worm (paragonimiasis) as the cause of the hæmoptysis, since there was no eosinophilia; but I suppose it is also a remote possibility. As regards malaria, there appears to be no evidence of it, other than perhaps the anæmia.

Autopsy Findings.

DR. HURST: The patient had been an Indonesian, 5 ft. 9 in. tall, weighing 132 lb., of slim build and well nourished. There was slight pitting œdema of the legs as far as the thighs. There was also icterus of the scleræ and a recent right lower thoracic wound with a wide-bore drainage tube *in situ*. The relevant findings were in the chest and abdomen. The liver was greatly enlarged (11 lb.) and had pushed up the diaphragm and the lungs, which thus occupied a small volume. It was nodular, granular, and showed a uniform greenish discoloration. One of the largest nodules at the lower border was necrotic, ulcerated, and blood clot was adherent to it. It was the source of 26 oz. of blood and blood clot that was found in the peritoneal cavity. Situated in the right lobe there was a large hæmorrhagic and necrotic new-growth. The drainage tube was inserted into the centre of this growth, and the yellow material removed at operation was no doubt necrotic newgrowth. Several smaller nodules of the growth were also present in the right lobe, and these were even more hæmorrhagic and necrotic than the remains of the largest nodules.

Growth continuous with the main mass was invading the hepatic vein, the inferior vena cava and projected into the right auricle, where it was probably responsible for the unusual heart sound referred to at the end of the protocol. There was considerable obstruction to the inferior

vena cava, both by the newgrowth in its lumen and by the compression caused by the large nodule in the liver.

The small pleural surface of the lower lobe of the right lung was studded with numerous small, firm, yellow-green nodules, and one area of the right lower lobe showed congestion and consolidation consistent with partial infarction.

Other notable features of the gross findings were the abscence of splenomegaly (7 oz.), the absence of any evidence of syphilis, thrombosis of the prostatic venous plexus, the presence of minimal atheroma of the arteries and the absence of gynecomastia.

Careful examination of the intestinal tract showed no evidence of past or present amœbiasis or, indeed, any gross lesion to which the diarrhœa may be ascribed.

Microscopic examination showed that the cells of the newgrowth, while showing notable evidence of anaplasia, resembled closely the hepatic cells, and the newgrowth was a malignant hepatoma (hepatic cell carcinoma). The nodules in the lung showed a similar structure, and tumour emboli were found in branches of the pulmonary artery. The liver not involved by newgrowth showed a coarse portal cirrhosis.

Diagnosis.

Malignant hepatoma superimposed on portal cirrhosis with invasion of hepatic vein, inferior vena cava and right auricle and metastases to the lungs. Peritoneal hæmorrhage arising from necrotic newgrowth of the liver and intestinal helminthiasis.

Medical Societies.

PÆDIATRIC SOCIETY OF VICTORIA.

A MEETING of the Pædiatric Society of Victoria was held at the Royal Children's Hospital, Melbourne, on March 11, 1959.

Giardia Lamblia Infestation.

DR. J. COURT read a paper entitled "The Incidence of Giardia Lamblia Infestation of Children in Victoria", by himself and Dr. Clare Stanton (see page 438).

DR. CHARLOTTE ANDERSON said that she was grateful to Dr. Court for carrying out the survey into the incidence of giardiasis in Victorian children. She now always included a search for *Giardia* in the stools in the routine of investigation of patients with chronic diarrhœa or malabsorption, and it was helpful to know with what frequency the parasite occurred in children without any gastro-intestinal symptoms. During the past five to six years she had investigated about 180 patients referred with subacute diarrhœa or steatorrhœa, and among them *Giardia* had been present in the stools of 13 children, who showed no other organic gastro-intestinal abnormality. In only three of the nine was there definite evidence of malabsorption. In all 13, symptoms disappeared after eradication of the *Giardia* with mepacrine. Among the three patients with malabsorption, two were babies of about six to nine months, and one was a toddler of 18 months. All had failed to thrive and were anæmic, and their fat absorption had been below 90%; the last mentioned became normal within one to two weeks of eradication of the parasite. The weight gain during the early weeks after treatment greatly exceeded in all three cases the gain during a similar period before treatment. However, in two of them home care, hygiene and feeding of the child had been poor, and it was thought that the *Giardia* infestation might not be the only reason for the poor physical condition of those patients. Infestation was particularly heavy in all three, and one wondered whether that was necessary before malabsorption became apparent.

Dr. Anderson went on to say that from the literature it appeared that symptoms of malabsorption were present in patients from areas where poor nutrition and poor hygiene were common. That was particularly so in the work of Veghelyi. She believed that, as the *Giardia* cysts were so easy to find in the stools and the treatment was so simple and effective, a microscopic examination of the stool should always be requested, as well as a stool culture, in the case of any child with subacute diarrhœa. From Dr. Court's figures and her own, it was apparent that the presence of the parasite in the stools was rarely associated with symptoms in Victorian children; but she agreed that if the two were associated, then the patient should be treated with one or two courses of mepacrine until the parasite was eradicated.

DR. V. COLLINS said that he had been concerned with an outbreak of diarrhœa in a children's institution in England. *G. lamblia* had been found, and there had been a very convincing response to mepacrine. He had recently had a patient with anæmia, splenomegaly, a protuberant abdomen and diarrhœa with pale stools; the child had made a complete recovery after being given mepacrine.

DR. B. NEAL asked whether any special precautions had to be taken in collecting the stool for examination.

DR. CLARE STANTON replied that a fresh stool was preferred, but that it was not essential. In most instances the parasite was found at the first examination.

DR. M. ROBINSON said that, whilst in most cases there was a gratifying response to mepacrine, sometimes a second course was needed.

British Medical Association.

VICTORIAN BRANCH: SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on September 17, 1958, at the Department of Pathology, University of Melbourne. The meeting took the form of a demonstration arranged by the Department.

Disorders of Cerebral Blood Supply.

R. McD. ANDERSON discussed disorders of cerebral blood supply. He said that progress in the management of cerebro-vascular accidents had lately gained new interest with the suggestion that anticoagulant therapy was beneficial in their prevention. That concept was based on the hypothesis that many of the episodes were embolic in nature, although often no embolus was found in the supplying artery. Since there was sometimes atherosclerotic narrowing of a major supply artery, minor strokes might result from a temporary defect in local blood supply following a drop in systemic blood pressure; drugs producing a rise in the blood pressure reduced the incidence of recurrent strokes. Episodes of infarction occurred when cardiac output was at its lowest, and the exhibition of hypotensive drugs to elderly subjects occasionally precipitated infarction. A method of obtaining more detailed information on cerebral artery supply was presented.

Abnormal Nephrons in a Macroscopically Normal Kidney.

THELMA J. BAXTER demonstrated a kidney which was macroscopically normal, obtained from a patient who had not shown signs of renal disease. Microdissection of the kidney had shown that a proportion of the nephrons were significantly abnormal. In those nephrons the glomeruli were deformed, many being disk-shaped, and others were enlarged to various degrees up to definite cyst formation. the tubules showed some irregular dilatation, and there were well-defined diverticula. Those occurring in the lower part of the nephron were of the same type as had been previously described, but there were numerous pouchings in various parts of the proximal convoluted tubule and even in the juxtaglomerular region. The various abnormalities were demonstrated photographically.

Cytological Changes Following Injury.

I. K. BUCKLEY said that after mild injury to cells there was an escape from them of visually demonstrable material in the form of blebs. They were evanescent, gradually dissolving in the surrounding fluid. They had been demonstrated in transparent ear chambers in the rabbit; but observations had also been made with tissue of various kinds examined in the fresh state. The nature of the material was still uncertain, but the various investigations that had been made on it were described and illustrated.

Mitochondria.

G. S. CHRISTIE and MARGOT J. BAILIE gave a demonstration summarizing the salient features of the structure and functional activities of mitochondria under normal and pathological conditions. The microscopic appearance, the methods of staining, the electron microscopic structure

and the main features of the biochemical activities and functional organization of those important cell organs were summarized. Some of the structural and functional changes which had been observed in the mitochondria of abnormal cells were indicated, and some of the methods used in the investigation of that field of pathology were demonstrated.

Wound Hormones.

A. M. CUTHBERTSON discussed wound hormones. He said that the problem of the possible presence of substances in the blood which acted as specific accelerating agents in wound healing had been studied and discussed for many years, and the matter had been investigated again. The details of experiments carried out in rats were presented, the results obtained on the rate of healing of the wound being shown in the form of graphs. The conclusion was that no direct evidence could be demonstrated for the presence of substances liberated into the blood-stream from a healing wound, influencing the rate of closure of a similar subsequent wound.

Care of Pathological Specimens.

C. R. GREEN gave a demonstration of the techniques of handling surgical and autopsy material so that it might serve the threefold purpose of providing maximum information to the operator, a permanent good-class specimen for use in museums and in student teaching and good material for research. Common examples of the mismanagement of such material were also shown.

Knife-Sharpening Machines.

S. V. HOHLOV demonstrated several forms of apparatus for the production of sharp microtome knives. They ranged from simple pieces of apparatus employed manually, through the semi-automatic types such as the "M.S.E. Sharpener" up to the completely automatic machines of various kinds. One of them had been designed and built in the department. Its essential part was a moving platform containing the glass plate on which the knife was sharpened, the action being produced by reciprocal motion, as opposed to the circular motion of older machines. An imported machine, in which the sharpening surface was moved rapidly laterally on a vibrator, produced a different kind of surface. The various results of the sharpeners were demonstrated.

Intracellular Localization of Carcinogens.

P. E. HUGHES gave a demonstration of the biochemical investigation of liver homogenates, showing the site of localization of carcinogens.

Connective Tissue.

J. V. HURLEY and KATHRYN HAM demonstrated some of the techniques available for the study of the development of granulation tissue and factors affecting its growth. It was reported that work on that subject, with special reference to the mode of action of the aminonitriles, was at present in progress in the Department.

The Histogenesis of Canine Mammary Mixed Tumours.

ANNE JABARA demonstrated a large series of canine tumours, and described and illustrated the features of the mixed tumours. The histological appearances and the conclusions drawn from them were given. It was shown that the "mixed" tumours developed as the result of metaplasia of epithelial tumours.

Plastic Embedding of Specimens.

I. K. JONES said that the embedding of specimens in solid plastics had become routine procedure, and was simple in the case of some materials, but presented considerable difficulty with regard to retention of colour and maintenance of form in other cases. The results obtained depended largely on the kind of plastic employed and also on the type of plasticizer, which determined the rate of setting of plastics and also the liberation of heat and thus the formation of gas bubbles. The results of investigations into some of those problems were shown.

Demonstration of Electronic Blood Counter.

C. J. LOUIS said that the "EEL" electronic blood counter provided a rapid and accurate method of producing red and white blood counts, and thus was a valuable addition to the laboratory armamentarium when numerous counts had to be obtained. In the Department that was particularly important in work being done on leukæmia in mice. The number of animals investigated was considerable; but in addition the apparatus had the advantage that satisfactory results could be obtained from small quantities of material. The various components of the apparatus and the possibility of easily obtaining repeated observation were demonstrated.

Bone Resorption.

E. STOREY demonstrated various phases of bone resorption in experimental animals. Microradiographs showed that the early changes during resorption of bone in the rabbit following cortisone administration were associated with increase in width of vascular channels and irregularity of bone edges. In the rat, when cortisone was administered, instead of bone resorption, dense sclerotic bone developed in the metaphyseal region of long bones. On diets deficient in, or unbalanced with respect to, calcium and phosphorus, rapid bone resorption occurred, and animals developed gross osteoporosis when cortisone was administered. The results indicated that the effect of cortisone on bone varied from species to species, and in the rat, resorption or sclerosis of bone developed depending on the calcium and phosphorus levels in the diet.

Endemic Amœbiasis.

J. D. TANGE and A. M. CUTHBERTSON presented a demonstration, the material for which comprised patients admitted to the Melbourne metropolitan hospitals over a twenty-year period. The criteria for diagnosis of endemic amœbiasis were the demonstration of the parasite and the response to specific therapy, and patients who had recently entered the country were excluded from consideration. Twenty-two patients were found to have colitis alone; 13 suffered from hepatitis and nine from some other complication. The pathology of each of those modes of presentation was illustrated. Over one-quarter of the patients had not been out of Australia.

Frozen Section and Other Techniques.

E. EUCKERT discussed first frozen sections. He demonstrated the cutting of frozen sections from unfixed tissues on an ordinary frozen-section microtome. Sections were subsequently fixed in methyl alcohol on the slide and stained. It was stated that the method was faster than that of fixed tissue, that the sections attached themselves better than after fixation, and that the staining results were better.

With regard to resin-embedded sections it was stated that experience had shown that thinner sections could be cut, and more easily, after resin embedding than with "Perspex". A section shown under a microscope had been cut at 4 to 5 μ. The routine procedure for preparation of monkey cords for histological study in relation to Salk vaccine testing was also shown.

Aids to Electron Microscopy.

S. WEINER demonstrated a number of ideas for improvements to various aspects of the technique of electron microscopy. They included methods for accelerating the polymerization time of embedding material, special flat embedding techniques, modification of grid holders, elimination of vibrations, various electron stains, infusion fixation apparatus, a new biopsy needle, methods of making glass slides, a small refrigerator for the transport of chemicals and specimens, and several other suggestions embodying original ideas and modifications of standard practice.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

MEDICAL OFFICERS OF THE VOLUNTEER FORCES (1883).[1]

[From the *Australasian Medical Gazette*, October, 1883.]

AMONGST other professional changes which have lately occurred is the appointment of Dr. W. D. C. Williams as Surgeon-Major to the Permanent Artillery Force of New South Wales. As a gold medallist in Surgery at University

[1] From the original in the Mitchell Library, Sydney.

College, London, and as having been acting medical officer for some time, he had claims to the appointment, which amongst those most concerned is a subject of congratulation that they have been recognized by the Government.

The state of the Medical Staff of the Volunteer Forces of the colony is not satisfactory: at present it consists of two surgeons only, the principal medical officer Dr. Dansey and one other, Dr. McDonagh, the calls upon whose time, in attendance at parades at the rifle range, etc., must, in consequence of their paucity of numbers, be greater than men in private practice can afford. Should any call for real service arise, the staff would have to be greatly increased, and men, novices to the ordinary routine duties of military surgeons, appointed. As the offices are nearly, if not quite, honorary, expense can hardly be the reason for this state of things.

Obituary.

CRICHTON RAOUL MERRILLEES.

WE are indebted to Dr. George Cole for the following account of the career of the late Dr. C. R. Merrillees.

Crichton Raoul Merrillees, who died on April 7, 1959, was born on February 11, 1884: like his elder brother Bertram Cecil Merrillees (who died on active service in South Africa in 1901), he was educated at the Melbourne Church of England Grammar School, which he entered in 1896. He took an active part in the life of the school, was in the athletic team in his last two years, and earned a commission in the school cadet corps. He was a keen rifle shot and was a member of the rifle team, which he captained in his last year at the school. He matriculated in 1900, but remained at school until the end of 1901, obtaining honours in science. In 1902 he began his medical course at the University of Melbourne, in which year he won a Trinity College exhibition. He obtained honours in chemistry and biology in 1903 and in histology in 1904, and divided the exhibition in physiology the following year. Having completed the early years of his course at Melbourne, he went to Edinburgh, where he graduated L.R.C.P. and L.R.C.S. in 1907. While at Melbourne, he won his half-blue for lacrosse in the years 1905 and 1906.

After graduation, Merrillees returned to Australia, and for several years he engaged in general practice in the country at Pyramid Hill in Victoria. However, like many young men of his age, on the outbreak of the first World War he felt the call of service, and as soon as he could he joined the Australian Army Medical Corps with the rank of captain. He went overseas in December, 1916, and served in France from early 1917 to the end of the war, being twice wounded, the first time in May, 1918, in the operations on the Somme. He had first been posted to the 16th Field Ambulance, and later was transferred to the 13th Field Ambulance. In January, 1918, he was promoted to the rank of major, and was posted to the 4th Australian Divisional Engineers as regimental medical officer. After his return to duty he took part in the battle of Hamel with this unit, and in August was attached to the 13th Infantry Battalion as regimental medical officer and took part in the battle of Amiens, in which he received his second wound. He was, however, able to remain with the battalion until the Armistice. He returned to Australia, and for some time after his return he was on the medical staff of the 11th General Hospital at Caulfield. After his demobilization in 1920 he retained his interest in military medicine, and for many years he commanded a divisional hygiene section in the Commonwealth Military Forces. In 1935 he was appointed director of hygiene with the rank of lieutenant-colonel.

Before his return to Australia he had obtained the Fellowship of the Royal College of Surgeons of Edinburgh, and also the diploma of public health and the licenciate of the Faculty of Physicians and Surgeons of Glasgow. On November 30, 1920, he was appointed to the medical staff of the Victorian Department of Health as a health officer, and on February 9, 1927, on the retirement of the late Dr. J. J. Johnston, he was appointed to succeed him as District Health Officer of the Metropolitan Health Area. In 1945 the position of Senior Health Officer was created, and on December 17 of that year C. R. Merrillees was appointed to the post. On the retirement of Dr. H. Featonby on October 10, 1946, he was appointed Chief Health Officer and Chairman of the Commission of Public Health. He retired on February 11, 1949.

Although in the last few years of his service with the Department of Health he occupied the senior positions, it is as a district health officer that C. R. Merrillees made his mark and left the impress of his personality on the Department. Under the *Health Act* of 1919, the State of Victoria was first divided into health areas, each with a full-time medical officer assisted by a district health inspector. The duties of the district health officer are many and various, but may be summarized as being the link between the central and local health administrations. A statutory duty is "to advise and assist, as he deems fit, the municipal medical officers of health" who, with one exception, in Victoria are part-time officers, usually busy general practitioners. These duties call for a wide knowledge of administration, of the sanitary problems associated with modern industry, and of epidemiology and modern methods of prevention of infectious diseases. Merrillees brought to these duties a keen brain and a tremendous enthusiasm for public health. He profited by working under two experienced administrators, the then Chief Health Officer, Dr. E. Robertson, and his immediate superior, the late Dr. J. Johnston, and from both he learned much of the technique of his work. But his intense interest in epidemiology and prophylactic methods was all his own. Like most of his departmental confrères, he at first engaged mostly in bringing the sanitary administration of his health area into compliance with the provisions of the new *Health Act* of 1919; but when this was accomplished he undertook the organization of a widespread campaign of immunization against diphtheria in the schools throughout the metropolitan area. In this matter he acted as the leader of his brother district health officers, and before long the campaign was extended throughout the State. It would no doubt be over-estimating his part to give him the sole credit for the commencement of diphtheria immunization in Victoria; but it is no exaggeration to say that it was his example and his enthusiasm that inspired his colleagues, both departmental and municipal, and materially accelerated the dramatic reduction in the incidence of the disease which occurred between 1932 and 1947. A statement in *Victorian Health Bulletin*, Number 91, is as follows: "In 1932 the incidence was 400 cases for each 100,000 of population. In 1939 it was 85 and in 1947 it was 19."

Before the establishment of the Industrial Hygiene Division of the Department, Merrillees, as district health officer of the central health area, was called on to deal with a number of technical problems caused by the increasing complexity of modern industrial processes. But his main interest was in the field of epidemiology, and his major feat in that field was the elucidation of the cause and the method of spread of Melbourne's last great typhoid epidemic, that at Moorabbin in 1943. This outbreak was explosive and sudden, and shattered for ever metropolitan complacency as to its milk supply. His report on this was a masterpiece. In his foreword to the report the late Frank Scholes, then medical superintendent of the Queen's Memorial Infectious Diseases Hospital at Fairfield, wrote:

> Essential data were collected and made available by Dr. Merrillees at an astonishingly early date, and to my mind the acumen, sagacity, energy and speed displayed by him were remarkable. It is necessary to read between the lines . . . to realise the amount of travelling, cross-questioning, collating and recording that enabled the prompt elimination of foodstuffs which have been objects of suspicion, while naturally he was concentrating on the two most probable vehicles of infection . . .

As a subordinate officer he liked his own way, but his professional work was always of a high standard. As Chief, he required of his subordinates as high a standard of performance as his own. His manner was at times abrupt, for he detested inefficiency, but under it all was a kindly nature. His hobby was gardening, and no man who loves flowers can be as stern as he liked to appear to be. And the metropolitan charity with which he associated himself can tell of his great assistance over many years. He had much in common with one of the nineteenth century pioneers of public health, the great Edwin Chadwick, and like Chadwick did not always receive the recognition he deserved.

DR. WALTER SUMMONS writes: My recollections of C. R. Merrillees ("Meg") go back to the early years of the century. He was a few years my junior, and we met on

the lacrosse field; in this game he wielded a good stick backed by a lot of enthusiasm. This word is the keystone of his life. His work was full of it in his endeavours to lessen the prevalence of disease among humans. First, as a departmental medical officer of the Department of Health, his reports went straight to the roots of troublesome matters, and later, as a senior officer, his recommendations were usually carried out.

He had a nervous temperament, and this was mainly evidenced in a hesitancy of speech. One amusing incident occurred when "Meg", as the officer of the central health authority, was investigating an outbreak of typhoid fever at Sandringham. The local medical officer of health had a similar hesitancy. (Both of them had always thought that the stammer had been overcome.) However, at the interview words soon rang out: "Now l-l-look h-here, d-don't you make f-f-fun of me!" said one to the other, till they discovered the hitherto unknown fact that both of them were victims of the same speech defect, and all ended well.

Later Merrillees rose to be head of the Department and Chairman of the Commission of Public Health. It was in this post that I came most in personal contact with his work. He was a worthy comrade of that efficient band of chief health officers. Until his death there were four of them living in retirement—showing that there must be something in preventive medicine; that left Dr. E. Robertson, Dr. H. Featonby and Dr. G. E. Cole, with Dr. Kevin Brennan still holding the two posts. The high standard of administration and the high level of public health in Victoria are the outcome of the conscientious work, skilled ability and medical knowledge that these medical officers have at all times shown. As an interested member of the Commission I have seen their enthusiasm for the work, and word my praise to them—not the least being C. R. Merrillees.

In retirement his energy took him more and more into his hobby of camellia growing. On this subject he was the authority of the State. It was a pleasure to listen to his scientific dissertations on the cultivation of this shrub, and to walk with him amongst his valued trees. He made this hobby into a minor commercial project; but the proceeds went entirely to the support of the Mission of St. James and St. John. He and his wife, who predeceased him by some eight years, were great workers for the poor and aged for whom the Mission cared. The world is poorer by his death.

The REV. S. H. BURRIDGE, of the Mission of St. James and St. John, writes as follows: Some months ago, our very dear friend Dr. Crichton Raoul Merrillees was stricken with a severe illness from which he did not recover. Although his death was not unexpected, nevertheless it was a shock, and we of the Mission realized that another great friend and benefactor had finished his work on earth; but he certainly laid a foundation upon which others will be called upon to build. "God buries His workmen, but still carries on His work." It was my privilege to conduct the funeral service, as it had been on the occasion of the death of his wife some years previously. It was clearly seen, by the large gathering of men and women, in what high esteem Dr. Merrillees was held by the members of the medical profession and others who came to pay their last respects to him.

During his lifetime he was very concerned about doing something to prevent rather than cure disease. During his period with the Department of Health he was always willing and ready to give advice when approached over some difficulty which confronted us, especially among women in the "Fairhaven" home. He was also most anxious to do something practical for the unwanted baby, the under-privileged child and the wayward girl or boy.

One of his great hobbies was the growing and propagation of camellias, and the proceeds he received from the sale of these he generously donated to the Mission of St. James and St. John, which, over the years, amounted to hundreds of pounds.

Dr. and Mrs. Merrillees will always be remembered for their charming manner, their generosity and their kindly interest in the distressed. All who knew them felt the better for having known them, and we mourn the loss of two very gracious people.

MR. A. W. JESSEP, M.Ag.Sc., President of the Australian and New Zealand Camellia Research Society, writes: Dr. C. R. Merrillees was not only a leader in his profession, but was also a keen nature lover and noted horticulturalist. He was an active member of several horticultural societies. Camellias were his main hobby; his knowledge of them was profound, and he gave freely of it to his friends. His reputation as an expert on these flowers was world wide, and overseas camellia societies were always anxious to have articles on the subject from his pen for publication in their journals.

In 1949 he worked hard to persuade a group of his friends to form a Camellia Society in Victoria, and under his guidance it was established and has flourished. Research into camellia problems was one of his objects, and in 1951 he was one of four Australians who formed a research society which now has a membership of some four of five hundred both in Australia and overseas. He was the chairman of the Victorian branch of the Society from its inception until his death.

Dr. Merrillees was a great supporter of charitable institutions, and for some years he propagated hundreds of camellia plants and gave the whole of the proceeds from their sale to the Mission of St. James and St. John. His services as a judge of camellias were eagerly sought after, and he gave this service willingly. He commenced a class for camellia judges and trained several, who are now qualified to carry on his work. His very interesting camellia garden was open annually to visitors, and no real camellia lover was ever refused a cutting from his choice plants if one was available. In 1955 he visited Japan with the object of studying the plants in their native country. His trip was most successful, and in spite of his failing health he gave freely of the knowledge that he had gained.

In addition to the great loss to the Society of his profound knowledge of camellias, members will miss Dr. Merrillees' cheerful smile and friendly demeanour at meetings. He was a great man, and those who knew him well respected him not only for his knowledge of camellias, but also for his great understanding of human nature. Truly we have lost a great friend.

WILLIAM THOMAS DALY MAXWELL.

WE are indebted to Dr. George J. Duncan for the following account of the career of the late Dr. William Thomas Daly Maxwell.

William Maxwell died in May, 1959, in the hospital where he had worked for many years, after a long and painful illness which he bore with great fortitude and patience.

Having gained his Leaving Certificate at the Grafton High School in 1914, he entered the Faculty of Medicine in the University of Sydney in 1915. His course was a notable one, as he gained distinction in every year, was awarded the Clipsham Memorial Prize for Surgery in his fourth year and qualified with first-class honours at graduation, being bracketed in third place with the late Edna Smith, first place being awarded to John Irvine Hunter. He was a prosector in 1916-1917, and more than a generation of students have admired beautiful examples of his dissecting skill in the Wilson Museum of Anatomy.

After graduation, Maxwell was appointed a resident medical officer at Sydney Hospital, where he had been a student. In the following year he and fellow resident, the late Dr. Keith Muston, purchased Sir Earle Page's practice at Grafton, and immediately Maxwell evinced a particular interest in surgery. As he had made surgical specialism his goal, he sold his share of the practice in 1924, came to Sydney and bought the general practice of the late Dr. John Tansey at Surry Hills. In the same year he obtained an appointment at St. Vincent's Hospital, Sydney, as assistant surgeon, which marked the early fruition of his ambition. In 1934 he sold his general practice and devoted himself to surgery as a specialty in Macquarie Street, where he had taken rooms some years previously. He was appointed to the senior surgical staff at St. Vincent's Hospital in 1934, eventually becoming senior surgeon; he retired to the consulting staff in February, 1958.

During World War II Maxwell served as a specialist surgeon in the Royal Australian Air Force. He was a foundation Fellow of the Royal Australasian College of Surgeons, and for some years was consulting surgeon to St. Margaret's Hospital.

In 1925 he married Miss E. Scully, and their child, Margaret (Mrs. D. T. Wright), is married to a Canadian doctor of engineering and resides in Canada with their

two children. She flew to Sydney some weeks before her father's death.

Bill Maxwell was quiet of speech, of a retiring, reserved disposition, yet forceful when his opinion was sought or opposed; a master of surgical technique and diagnosis; a doctor beloved by his patients because of his calm, kindly approach to them; and a firm and loyal friend of those he liked and admired. His main intellectual interest was history, ancient and modern, of which he was an avid reader. For many years his winter holidays were spent at Coolangatta, because of his liking for fishing, and his other hobby was the care of his garden, in which he spent much of his leisure. He reached eminence in his profession; but his last years were unfortunately marred by a slow progressive illness, which eventually forced him to retire from active work. His funeral left the Sacred Heart Church, Darlinghurst, after a Requiem Mass which was largely attended, and he was buried at Waverley Cemetery.

Correspondence.

LEUCOTRICHIA TOTALIS FROM CHLOROQUINE.

SIR: Chloroquine salts have been used for six years in this State in the treatment of lupus erythematosus and rheumatoid arthritis.

In rheumatoid arthritis variable results have been recorded, but the consensus of opinion is that it has a definite value in suppressing the inflammation, reducing the symptoms and in improving function. Many cases of remission have been shown at meetings and several of apparent cure.

Bleaching of the hair is seen in the majority of cases, progressively more marked and more complete from the dark to the fair person. The bleaching occurs in the growing hair, and restoration on suspension of the drug occurs in the same way. The loss of colour is more marked in the exposed hair, but is frequently generalized in fair persons. With this, one commonly sees sensitization of the exposed skin to sunlight and even to wind effect, so that patients dare not go to the beach for fear of severe sunburn. It is interesting for this reason to see chloroquine salts used for the treatment of light sensitivity. A frank dermatitis is occasionally seen, similar to the well known "Atebrin" dermatitis.

The dose used in the reported case was large. Few people can tolerate 450 mg. of base daily without gastro-intestinal irritation. Blurred vision due to corneal opacities sometimes proceeding to ulceration, diplopia, pruritus and vertigo are seen in this dosage range very commonly.

Other details worthy of note are the danger to the patient with porphyria. Deaths have been recorded during the use of chloroquine. Myasthenia gravis and multiple sclerosis have appeared or been aggravated during exhibition.

All the side effects disappear or cease to be troublesome on suspension of medication.

Yours, etc.,

141 Macquarie Street, Sydney.
R. G. ROBINSON.

September 15, 1959.

ANKYLOSTOMIASIS OR ANCYLOSTOMIASIS?

SIR: I have read Dr. Leslie J. Shortland's letter (July 30, 1959) about ank(c)ylostomiasis. I do not think we should be influenced by words, such as "cycle", which have become so thoroughly English, or that we need be such ardent hellenizers as Robert Browning who wrote Kupris for Cypris—see the "Oxford Book of Greek Verse in Translation", pages cix-x and page 392. As the editors point out, consistency is important but difficult. In this book (page xvi) the Epinikian Ode of Pindar is so spelt and should be so pronounced, while in the "Oxford Classical Dictionary" (under Pindar) it is spelt Epinician; but it is consistency in the same work which is meant.

By spelling the word in question ancylostomiasis, we are only indicating that we are latinizers and, to some extent, anglicizers.

If consistency is difficult in the literary field, how much more difficult is it in the medical and scientific one! To the Greekless—that rather superior term often used by scholars these days—it is impossible. Although it is doubtful if Browning ever had to write the words, he would perhaps hardly have insisted upon enkephalitis, elektrokardiogram, and gynækology (let alone gunaikology!). That would, to us, seem to be germanizing as well as hellenizing. Confusion is added to the situation by the "Concise Oxford Dictionary's" (I have not the larger one by me) anchylosis and its reason for it. The French rule for "c" before vowels and "y" seems to have some influence even upon us; no one would want to see or hear kystitis or even kestode, although Fowler's ears—see "Modern English Usage" under Greek G—would not have been offended by these; he would allow pronunciation of osteomalăkia.

However, we cannot depend upon such a rule. Most of us would no more want to hear ensephalitis than ansylostomiasis (and compare remarks upon the Epinician and osteomalacia). What are we to say, for example, to onkosursiasis, the pronunciation given in "Stedman's Medical Dictionary" for oncocerciasis, for three "kappas" are involved? Fowler would certainly have allowed the pronunciation of onkokerkiasis, but he would probably not have insisted upon it.

In the case of ankylostomiasis, therefore, it seems that we can please ourselves whether we write a "k" or a "c", although "k", if not written, should be pronounced even if, with apparent inconsistency, we do not say "osteomalakia" and might choose to say "onkosurkiasis".

One would certainly not like to see anchylostomiasis any more than one likes to see anchylosis, as there is no question of a "chei" here.

Yours, etc.,

48A Irvine Street, Peppermint Grove, Western Australia.
GERALD C. MOSS.

September 9, 1959.

CIGARETTE SMOKING AND LUNG CANCER.

SIR: In all the literature I have read concerning this subject, I have not been able to find any specific inquiry made concerning cigarette smokers who have contracted lung cancer and who habitually used cigarette lighters. It seems to me that such a source of inquiry may prove fruitful.

If your readers could put me in touch with any literature on the subject, I would be most grateful.

Yours, etc.,

254 St. George's Terrace, Perth, Western Australia.
ROBERT G. LINTON.

September 4, 1959.

SIR: Dr. Rubinstein's letter (Journal, September 5) makes the obvious statement that early diagnosis of lung cancer is still of prime importance. Two cases, patients of mine, who have had abnormal shadows detected in their lungs by mobile X-ray units during the past few months, prompt me to call attention to the fact that early diagnosis of a possible bronchial carcinoma is sometimes neglected.

The first, a male, aged 46 years, was recalled owing to a small round opacity having been found at the left hilum. Following re-X-ray, which confirmed the presence of this shadow, he was given an appointment for a further X-ray in three months' time. At the patient's request the X-ray was made available to me, and I immediately referred him to a chest specialist, who considered that surgery was indicated. At operation, long before he was due for his next X-ray, a carcinoma of the bronchus was found.

The second case, a female, aged 35 years, was found to have a small round shadow in the middle lobe of the right lung. She was referred to a pulmonary unit of a public hospital, where it was considered that the correct procedure was to resect it. She has been placed on the waiting list, and now almost two months later she is still waiting admission.

When doubtful shadows are discovered during mass X-ray surveys, the diagnosis often can only be made at thoracotomy. It is surely these cases which may offer early detection of bronchogenic carcinoma. The object

of the X-ray survey is lost if such patients are either given appointments for re-X-ray at a later date, or forced to wait several months for admission to hospital.

Yours, etc.,

M. M. LEVENE.

Cnr. Hardy Street and Murriverie Road,
North Bondi, N.S.W.
September 8, 1959.

PARAPLEGIC ASSOCIATION OF WESTERN AUSTRALIA: EMPIRE GAMES.

SIR: It is the intention of the above organization, acting through Royal Perth Hospital, Perth, Western Australia, to arrange for and conduct a Paraplegic Empire Games just prior to the Empire Games to be held in Perth in 1962. I would be most grateful if you could make mention of this fact in your Journal, inviting any person interested to communicate with me over the matter, for it is hoped that teams will reach Perth from all over the Commonwealth countries. Further details will be supplied on application, as to who is arranging for the team in each particular country.

I would be most grateful for your assistance in this matter, as my Committee hopes that this will be made as widely known as possible.

Yours, etc.,

G. M. BEDBROOK,
Secretary.

Paraplegic Unit,
Shenton Park Annex,
Shenton Park, W.A.
September 7, 1959.

Notes and News.

"Havelock Ellis in his Australian Setting."

Mr. Kenneth Cable, M.A., Lecturer in History in the University of Sydney, will read a paper entitled "Havelock Ellis in his Australian Setting" at History House, 8 Young Street, Sydney, on Tuesday, September 29, 1959, at 7.45 p.m. The President of the Royal Australian Historical Society extends an invitation to all interested members of the medical profession to be present.

Care of Mothers and Children in Laos.

A programme for the improvement and development of health care services for mothers and children in Laos has been undertaken by the Government of Laos and the World Health Organization. A medical officer with extensive training and experience in the development of maternal and child health services, health education programmes and the training of health personnel has joined the staff of WHO in the Western Pacific Region as the first member of the WHO team to be assigned to Laos, and he is shortly to be joined by a WHO nurse educator. Their first task will be a survey of the problems and needs of Laos and to assist the government in planning adequate health services to mothers and children.

Services Canteens Trust Fund.

Post-Graduate Scholarship.

The Trustees of the Services Canteens Trust Fund are inviting applications for a post-graduate scholarship for study overseas. The fields of study in which the scholarship may be awarded are: (i) any course at any approved university throughout the world; (ii) aeronautics in England or America; (iii) travelling scholarship in any field. An applicant wishing to pursue any other branch of study may apply to the trustees for a scholarship in that field.

The scholarship is valued at £A1000 *per annum*, and will be tenable for a period of up to three years.

The scholarship is open to a child (including step-child, adopted child or ex-nuptial child) of a person who was at any time between September 3, 1939, and June 30, 1947, (*a*) a member of the Naval, Military or Air Forces of the Commonwealth, or (*b*) a member of any nursing service or women's service attached or auxiliary to any branch of the Defence Force of the Commonwealth, including (*c*) members of the canteens staff of any ship of the Royal Australian Navy, and any person duly accredited to any part of the Defence Force who served in an official capacity on full time paid duty.

Selection will be entirely on merit and will be competitive. A scholarship will be granted only to an applicant who, in the opinion of the trustees, has outstanding ability, is of suitable character and is likely to obtain lasting benefit to himself or herself and to Australia by further study. The scholarship will not necessarily be awarded each year.

The following will be taken into consideration in determining the award of the scholarship: (i) academic career; (ii) ability for research work; (iii) character; (iv) the future value to Australia of the subject of research selected. The selection each year of the scholar to be awarded the scholarship will be made from all applications received from eligible persons by the prescribed closing date.

Applications must be lodged with the General Secretary, Services Canteens Trust Fund, Victoria Barracks, St. Kilda Rd., Melbourne, by November 2, 1959. Applications should be transmitted through the Regional Secretary in the applicant's State.

Application forms and any further information may be obtained from the General Secretary, whose address is shown above, or from the Regional Secretary, Services Canteens Trust Fund, in each State. The addresses of Regional Secretaries are as follows: Queensland, Victoria Barracks, Brisbane; New South Wales, 84 Pitt Street, Sydney; Victoria, Victoria Barracks, Melbourne; South Australia, 22 Grenfell Street, Adelaide; Western Australia, Swan Barracks, Perth; Tasmania, Anglesea Barracks, Hobart.

Higher Training Education Awards.

The trustees of the Services Canteens Trust Fund are inviting applications for education awards for post-graduate studies in auxiliary services to medicine, welfare and science, such as nursing (male and female), physiotherapy, speech therapy, occupational therapy, orthoptic therapy, training as laboratory technician. The awards will be granted for any full-time post-graduate course at the college or training centre selected and will be tenable for the period prescribed for the course.

The value of higher training education awards will be determined by the trustees in each case, and will be designed to cover the costs involved in the course, such as fees, books, and stationery required for the course, fares as necessary and a reasonable maintenance allowance.

Any person whose mother or father served in the Australian Armed Forces between September 3, 1939, and June 30, 1947, is eligible to apply for an award. Persons who themselves served in the Forces during the 1939-45 war, but neither of whose parents served during the war, are not eligible.

Applications must be made on the prescribed form, which can be obtained from the General Secretary of the Services Canteens Trust Fund or the Regional Secretary of the Fund in the State in which the applicant resides. Applications must be lodged with the General Secretary of the Services Canteens Trust Fund, Victoria Barracks, St. Kilda Road, Melbourne, not later than December 1, 1959, irrespective of the date the course proposed commences next year. The addresses of the Regional Secretaries in each State are as given above.

A New Building for the Royal College of Physicians.

The Isaac Wolfson Foundation has made a grant of £450,000 sterling to the Royal College of Physicians of London to cover the cost of building a new College. This is stated to be the greatest benefaction the College has received in its history of nearly four and a half centuries. The present College house, at the corner of Pall Mall East and Trafalgar Square, was built in 1825, when there were 90 Fellows. There are now 900. The College is to have a beautiful and modern building in Regent's Park, and will thus be able to expand its activities and develop new enterprises.

Specification for Dental X-Ray Films.

The Standards Association of Australia announces the issue for public critical review and comment of Document 441, Draft Australian Standard Specification for dental X-ray films. The specification is being prepared at the request of both the Commonwealth Department of Health and the Australian Dental Association. It is based on work done by the Commonwealth Bureau of Dental Standards and on British Standard 2585-1955, "Dimensions of Dental X-Ray Films". It is intended that the specification be used as a basis for assessing the quality

and dimensions of dental X-ray film used in Australia. In particular, comment is sought on the possibility of formulating a suitable scale for classifying films according to speed. Copies of the draft can be obtained at the offices of the Association in the capital cities of the Commonwealth and in Newcastle, New South Wales, to which addresses comment should be forwarded by November 30, 1959, which has been fixed for the closing date.

Language Equivalent Dispensing Phrases.

A schedule of commonly used dispensing phrases, giving the language equivalents in French, Italian, German and Polish, has been prepared by Boots Pure Drug Company (Australia) Pty. Ltd. The book, which is attractively and conveniently produced, is intended primarily for retail chemists and hospital pharmacists dealing directly with New Australians who may not be able to read English instructions. The book is also available for medical practitioners if they request it.

British Standard for Spectacle Lens Materials.

A new publication on the British standard for spectacle lens materials is part of a series which is being prepared on ophthalmics. After the issue of B.S. 2738, "Spectacle Lenses" (which deals with optical properties of finished spectacle lenses made to prescription), the need was recognized for a standard dealing with the optical characteristics of ophthalmic lens materials, particularly to take advantage of some of the newer processes for optical glass manufacture. B.S. 3062 has consequently been prepared for use by both specialist lens producers and glass manufacturers as a step towards simplification in the field of ophthalmic lens materials. It deals with (*a*) white ophthalmic crown glasses, (*b*) flint glasses, (*c*) barium glass, (*d*) plastic materials used in the manufacture of ophthalmic lenses.

The terms used in the eight-page standard are defined in B.S. 233 "Glossary of Terms Used in Illumination and Photometry". (A glossary of terms used in relation to ophthalmic lenses is also in course of preparation.) Copies of this Standard may be obtained from the Standards Association of Australia, 157 Gloucester Street, Sydney, and from branch offices in capital cities. The price is 3s. 9d., plus postage.

The Medical Women's Society of New South Wales Annual Prize.

The following are the details of the Medical Women's Society of New South Wales Annual Prize.

1. The Medical Women's Society of New South Wales shall award a prize of the value of 25 guineas, open to any medical woman registered in New South Wales.

2. The prize shall be awarded for an original contribution on a subject of medical interest published or ready for publication during that year.

3. In the event of a contribution by two or more medical women in collaboration, the prize shall be divided equally between contributors. Work done in collaboration with other than medical women may be submitted.

4. The Medical Women's Society of New South Wales shall appoint examiners, and the award will be made on their recommendation.

5. The closing date for entries is December 31, 1959. Entries should be submitted to the Honorary Secretary, The Medical Women's Society of New South Wales, Rachel Forster Hospital for Women and Children, 150 Pitt Street, Redfern, N.S.W.

6. The prize shall not be awarded if either the examiners or the committee of the Society consider that the standard of the work or works is not sufficiently high to justify the award of the prize.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Post-Graduate Conference at Parramatta.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that in conjunction with the Central Western Medical Association, a post-graduate conference will be held in the Nurses' Lecture Room, Parramatta District Hospital, on Saturday and Sunday, October 17 and 18, 1959. The programme is as follows:

Saturday, October 17: 2 p.m., registration; 2.30 p.m., "Survey of the Uro-Genital Tract in Children", Dr. D. G. Hamilton; 4 p.m., question time.

Sunday, October 18: 10.30 a.m., "Modern Trends in Treatment of Skin Diseases", Dr. R. B. Perkins; 11.30 a.m., "Pitfalls in Drug Therapy", Sir William Morrow; 2 p.m., question time.

The fee for attendance is £3 3s. Those wishing to attend this course are requested to notify Dr. C. A. McDermott, 8 Carlton Street, Granville, as soon as possible. Telephone: YU 1570.

Post-Graduate Conference at Albury.

The Post-Graduate Committee in Medicine in the University of Sydney announces that, in conjunction with the Border Medical Association, a post-graduate conference will be held at the Albury Base Hospital on Saturday and Sunday, October 24 and 25, 1959. The programme is as follows:

Saturday, October 24: 2 p.m., registration; 2.30 p.m., "Current Problems in Urology", Dr. H. H. Pearson; 4 p.m., "Renal Physiology and Electrolyte Balance", Dr. H. Malcolm Whyte.

Sunday, October 25: 10 a.m., "Acute Cardiac Emergencies", Dr. J. G. Richards; 11.30 a.m., panel discussion: (i) "Renal Failure and Management of Urinary Infections"; (ii) "Hypertension and Renal Disease"; speakers, Dr. H. H. Pearson, Dr. H. Malcolm Whyte, Dr. J. G. Richards.

The fee for attendance is £3 3s. Those wishing to attend this course are requested to notify Dr. Ross S. Hayter, Honorary Secretary, Border Medical Association, 690 Dean Street, Albury, as soon as possible. Telephone: Albury 557.

ROYAL PRINCE ALFRED HOSPITAL: EAR, NOSE AND THROAT DEPARTMENT.

Seminar Programme, 1959.

THE staff of the ear, nose and throat department of the Royal Prince Alfred Hospital will conduct a seminar on the second Saturday of every month at 8 a.m. in the Scot Skirving Lecture Theatre. The main speaker will not exceed forty minutes, and there will be a discussion at the conclusion of his remarks. All medical practitioners and clinical students are invited to attend.

At the next seminar, to be held on October 10, 1959, Dr. R. G. Mackay will speak on "The Cartilagenous Pyramid of the Nose".

Congresses.

EIGHTH INTERNATIONAL CONGRESS OF HÆMATOLOGY.

THE eighth International Congress of Hæmatology, jointly organized by the International Society of Hæmatology and the Science Council of Japan, will be held from September 4 to 10, 1960, at Tokyo, Japan, in accordance with the resolution adopted at the seventh congress held in Rome in 1958. The main subjects of the Congress will be as follows: (i) nucleonics; (ii) leukæmia; (iii) hæmocytology; (iv) anæmia; (v) coagulation and hæmorrhagic disorders; (vi) immunohæmatology. There will also be several symposia on the main subjects. All members of the International Society of Hæmatology and all scientists interested in hæmatology and its allied fields are invited to attend the Congress. Information concerning the submission of papers and films (16 mm., silent or sound), as well as conditions of membership of the Congress, should be sought from the Secretary of the Organizing Committee of the Congress at the following address: Science Council of Japan, Ueno Park, Taito-ku, Tokyo, Japan.

AUSTRALASIAN CONFERENCE ON RADIOBIOLOGY.

THE third Australasian Conference on Radiobiology, to be held from August 15 to 18, 1960, at the University of Sydney, is sponsored by the Post-Graduate Medical Foundation in association with the Radiation Society. Professor

P. C. Koller, Professor of Cytogenetics in the University of London, and Dr. Peter Alexander, of The Chester Beatty Research Institute, Royal Cancer Hospital, London, will be the guest speakers. They will present papers concerning the primary biochemical and biological lesions in radiobiology, including a comparison of the effects of radiomimetic chemicals and radiation. There will be special reference to radiotherapy and gene mutation. There will be discussions on pre-radiation and post-radiation protection, on the chemical aspect and measures depending on the effect of radiation on the immune response. Again the speakers will mention radiomimetics as well as radiation itself with production of delayed somatic effects, such as shortening of the life span and induction of cancer.

Papers suitable for presentation in general in 15 to 30 minutes are now invited. Suggested titles should be communicated to the Convener before the end of February, 1960, and summaries (250 words) by the end of March, 1960. Papers need to be of radiobiological interest, but will cover the wide fields of biology, biochemistry, biophysics, genetics, immunology, radiation protection and health physics, etc. It is proposed to publish the proceedings.

Accommodation is available at the University of Sydney. Enrolment and accommodation forms will be forwarded on application to Dr. Peter Ilbery (Convener), Department of Preventive Medicine, University of Sydney, Sydney, N.S.W.

Royal Australasian College of Surgeons.

PRIMARY EXAMINATION FOR FELLOWSHIP OF THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS.

A PRIMARY EXAMINATION in anatomy (including normal histology) and applied physiology and the principles of pathology, will be conducted in Melbourne in March, 1960, for the fellowship of the Royal Australasian College of Surgeons. The written papers will be held on Thursday and Friday, March 3 and 4, 1960. The viva-voce section will commence on Monday, March 7, 1960. The examination is reciprocal with the primary examination for fellowship of the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh, and the Royal College of Surgeons in Ireland, or the primary examination in surgery of the Royal Faculty of Physicians and Surgeons of Glasgow and the College of Physicians, Surgeons and Gynæcologists of South Africa. Each examination is open to graduates of not less than one year's standing of a medical school approved by the Council of the College for the purpose.

Candidates must submit evidence of their qualifications and date of acquirement thereof. Forms of application for admission to the examination may be obtained from the Examination Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1, Victoria. The fee for admission or readmission to the examination is £26 5s., plus exchange on cheques drawn on banks outside Melbourne. The fee must be forwarded with the form of application so as to reach the Examination Secretary at his office in Melbourne not later than January 22, 1960. It is stressed that entries close at the College office in Melbourne on January 22, 1960, and that late entries cannot be accepted. Copies of the regulations governing the examinations for fellowship are available on application.

FACULTY OF ANÆSTHETISTS.

Primary Examination for Fellowship of the Faculty of Anæsthetists, Royal Australasian College of Surgeons.

A PRIMARY EXAMINATION in anatomy, physiology, pharmacology and pathology will be conducted in Melbourne in March, 1960 for the fellowship of the Faculty of Anæsthetists of the Royal Australasian College of Surgeons. The written papers will be held on Thursday and Friday, March 3 and 4, 1960. The viva-voce section will commence on Monday, March 7, 1960. Each examination is open to graduates of not less than one year's standing of a medical school approved by the Council of the College for

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED AUGUST 22, 1959.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.[2]	Australia.
Acute Rheumatism	1	..	3(2)	..	..	..	..	..	4
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	..	..	..	..	1	..	1
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	8(3)	7(6)	6(2)	..	..	1	2	..	24
Diphtheria	..	..	..	..	..	..	..	..	..
Dysentery (Bacillary)	..	..	1(1)	1(1)	..	..	3	..	5
Encephalitis	..	..	..	1(1)	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	81(16)	16(13)	6(1)	6(3)	..	1(1)	..	..	110
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	4	..	4
Leptospirosis	..	..	9	..	..	..	..	..	9
Malaria	..	..	1(1)	..	..	..	..	..	1
Meningococcal Infection	3(3)	..	..	..	..	1	..	..	4
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	1(1)	..	..	..	..	..	..	..	1
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	3(2)	..	..	..	..	..	..	..	3
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	12(9)	..	1	1(1)	..	..	..	14
Salmonella Infection	..	..	..	1(1)	..	..	..	..	1
Scarlet Fever	10(6)	20(15)	..	3(2)	..	..	..	..	42
Smallpox	..	..	2(1)	..	..	..	..	..	2
Tetanus	..	..	1(1)	..	1	..	..	..	2
Trachoma	..	..	..	..	1(1)	..	4	..	5
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	30(16)	11(8)	3(1)	8(7)	3(3)	3(2)	3	..	61
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	1(1)	..	..	..	..	..	1
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

[2] No case of any notifiable disease reported for A.C.T.

the purpose. Candidates must submit evidence of their qualifications and date of acquirement thereof. Forms of application for admission to the examination may be obtained from the Examination Secretary, Faculty of Anæsthetists, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1, Victoria. The fee for admission or readmission to the examination is £26 5s., plus exchange on cheques drawn on banks outside Melbourne. The fee must be forwarded with the form of application so as to reach the Examination Secretary at his office in Melbourne not later than January 22, 1960. It is stressed that entries close at the Faculty office in Melbourne on January 22, 1960, and that late entries cannot be accepted. Copies of the regulations governing the examinations for fellowship are available on application.

Notice.

BRITISH MEDICAL ASSOCIATION: VICTORIAN BRANCH.

The Sir Richard Stawell Oration.

THE twenty-sixth Sir Richard Stawell Oration, entitled "Personality Problems in Antarctica", will be delivered by Mr. P. G. Law, M.Sc., Director of the Antarctic Division of the Department of External Affairs, at the Royal Australasian College of Surgeons, Spring Street, Melbourne, on Wednesday, October 7, 1959, at 8.15 p.m. Mr. Law will speak on the reactions of people who spend long periods living and working in Antarctica, and will show a film of Mawson and the surrounding areas entitled "Address Antarctica".

THE CHILDREN'S MEDICAL RESEARCH FOUNDATION OF N.S.W.

THE following is a list of donations to the Children's Medical Research Foundation of N.S.W. received from members of the medical profession in the period September 9 to 15, 1959:

Dr. F. M. Cull (further): £10 10s.
Dr. Pamela Bulteau (further), Dr. I. B. Jack (further), Dr. and Mrs. C. Magee, Dr. F. Rosenfield: £5 5s.
Dr. C. R. and Dr. S. P. Firkin: £5.
Dr. and Mrs. J. B. Connolly: £1 1s.

Previously acknowledged: £8453 14s. 4d. Total received to date: £8491 5s. 4d.

Corrigendum.

ISO-IMMUNIZATION IN A MOTHER WHICH DEMONSTRATES THE "NEW" Rh BLOOD ANTIGEN G (rh^G) AND ANTI-G (rh^G).

WE are informed that there is an error in the "Addendum" (page 358) to the foregoing paper by R. Jakobowicz and R. T. Simmons, which appeared in the Journal on September 12, 1959. The sixth line of the "Addendum" should read as follows: "rh'rh(Cde/cde). They gave a strong direct positive".

Nominations and Elections.

THE following have applied for election as members of the New South Wales Branch of the British Medical Association:

Herbstein, Amos, M.D., 1946 (Univ. Bucharest) (registered under Section 17 (2)), 34 Greenwich Road, Greenwich.

Kisonas, Vytautas, M.D., 1939 (Univ. Kaunas) (licensed in accordance with the provisions of Section 21A of the *Medical Practitioners Act*, 1938-1958), Erin Street, Stroud.

Kalokerinos, Emmanuel, M.B., B.S., 1952 (Univ. Sydney), 15 Gallop Street, Berkeley.

The following has applied for election as a member of the Victorian Branch of the British Medical Association:

Twist, Elaine Mary, M.B., B.S., 1951 (Univ. Sydney), 50 Millewa Avenue, Chadstone, Victoria.

Deaths.

THE following deaths have been announced:

WEBSTER.—Edgar Ernest Webster, on September 3, 1959, at Brighton, Victoria.

GEORGE.—Sydney George, on September 8, 1959, at Ashfield.

MOSELEY.—Arthur Henry Moseley, on September 9, 1959, at Sydney.

ALLEN.—Sydney Herbert Allen, on September 9, 1959, at St. Kilda, Victoria.

Diary for the Month.

OCTOBER 1.—South Australian Branch, B.M.A.: Council Meeting.
OCTOBER 2.—New South Wales Branch, B.M.A.: Annual (1959) Meeting of Delegates of Local Associations with Council.
OCTOBER 2.—Queensland Branch, B.M.A.: Jackson Lecture.
OCTOBER 6.—New South Wales Branch, B.M.A.: Council Quarterly.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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